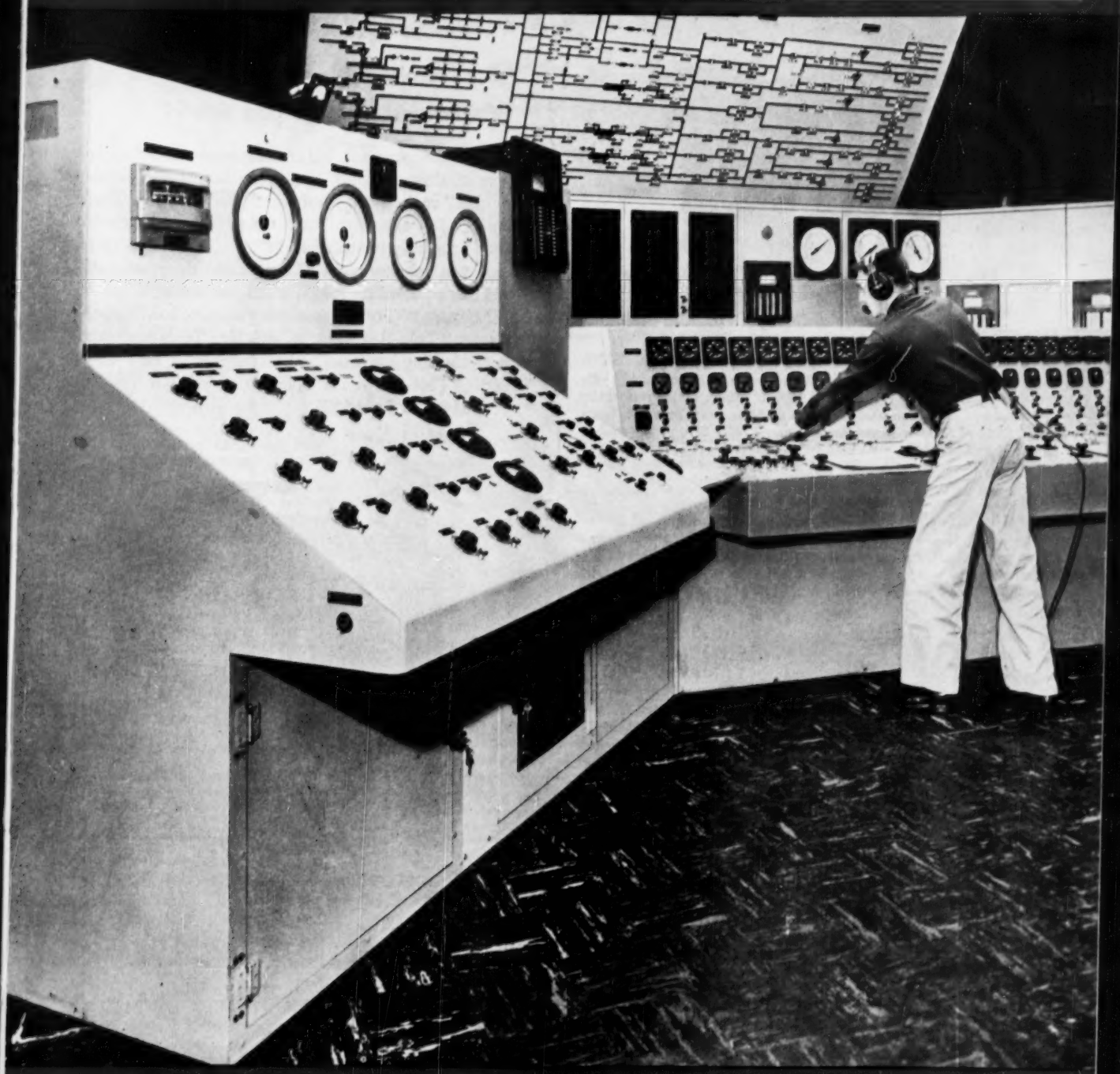
School Shop

vol. XVI no. 10
JUNE 1957

The Challenge of Automation to Technical Education
by Glade Wilcox
Students Plan a School Shop
by Lawrence M. Frederick
Crystal Radio
by Dean Nordell
Divergent Views on Industrial Education
by T. A. Hippaka

Cover story: Special skills are needed to operate this control console which watches over automated equipment in a large chemical plant. For more on the subject, see the story on page 9. (Photo courtesy of Hagan Chemicals & Controls, Inc.)



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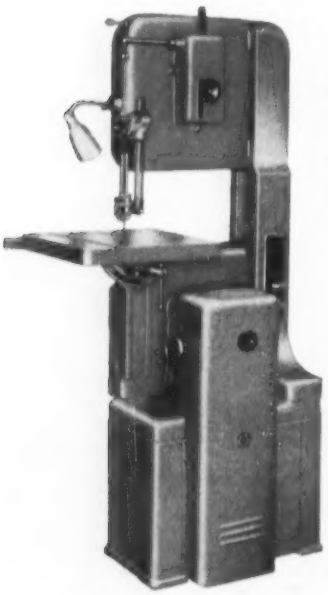

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School Shop

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

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Editorial and Business Office: 330 Thompson Street, Ann Arbor, Michigan.

Manuscript Information: Manuscripts are paid for at regular space rates and should be addressed to the Editor, School Shop, 330 Thompson Street, Ann Arbor, Michigan.

Subscription Rates: $3.00 a year; Canadian, $3.00 a year; foreign, $4.00 a year. Single copies, 40 cents each except April which is 50 cents. Special group rates for students in teacher-training institutions will be given on application.

Postal Information: Accepted as controlled circulation publication at Mount Morris, Illinois, and Ann Arbor, Michigan.

Advertising Sales Offices:

Chicago 4, Illinois—R. L. (Les) Grey, Western Manager, 53 West Jackson Blvd., Suite 740, telephone Harrison 7-9659.

New York 17, N. Y.—Macintyre-Simpson & Woods, 101 Park Ave., telephone Lexington 2-0020.

Ann Arbor, Mich.—Jerry Patterson, Mid-West Manager, 330 Thompson Street, telephone Normandy 8-7205.

Publication Information: Published monthly, September through June at Mount Morris, Illinois. Printed in the United States of America. **Copyright 1957 by Lawrence W. Prakken.**

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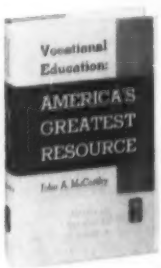

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Wanted: Technicians

The body of human knowledge needed in a modern industrial world has accumulated through the ages and, as time has passed, the speed with which new principles and practices have appeared has constantly accelerated. In our professional fields these developments have grown so tremendously that it is practically impossible for one member of a profession to master them all. This has made it necessary for professional people to specialize in one area of their field. They may have a general knowledge of the field as a whole, but they have a more complete knowledge of the area in which they have specialized.

Even in these special areas, the modern professional person must have a wide range of technical knowledge and he must assume responsibility for many different tasks. Among these tasks there are some that are more critical, while others are relatively less involved. This has led to the hiring of assistants to relieve him of the less important jobs. These assistants must know something of the area in which they are employed, but do not require the full professional training needed by the specialist.

The demand for assistants of this type has grown and is growing so rapidly that educators have become concerned about how to meet it. In some communities an effort has been made to meet the need by establishing technical institutes, community colleges, or junior colleges. In most of these institutions short-term terminal courses are offered, which are designed specifically for one or another of the professional areas to be served. While these courses have been helpful, they are far from being adequate to meet the existing shortage of this type of personnel. Additional means must be found if we are to keep abreast of modern technological developments.

A partial solution to the shortage is suggested by our experience in the early part of the present century. During this period the demand for skilled craftsmen in American industry exceeded the supply. In order to meet the shortage, thousands of tradesmen from many European countries were induced to come to America. This flow of workers continued until the corps of skilled men in the country was sufficient to meet the necessary demand for them.

Now we are faced with a similar situation in the area of technical assistants. Is it not conceivable that we might repeat this plan in this new shortage area? Could we not help ourselves by inducing some of the better graduates from the excellent schools of Europe to come to this country on scholarships, which might be paid for out of the millions of dollars we are spending in these countries? These young men would come for one or two years and, if they proved to be adaptable people who would fit into a democratic society, they might be given an opportunity to remain and become citizens.

Education, however, must make the major contribution to the supply of technical assistants. More technical institutes should be organized, and more of our junior colleges should become active in providing terminal curriculums which are designed to meet the needs of the vast number of young people who are needed to bridge the gap between the craftsman and the professional worker.

And we must not forget the potential supply of technicians to be found in our huge army of skilled mechanics. Here we have a group of people who have a background which would simplify their training in the technical phases of their work. For them, evening or late afternoon terminal programs should be provided.

The situation is critical, and it presents a challenge to our schools. What do we propose to do about it?—*T. D.*

A Salute to Two

New York State is losing two outstanding members of the profession this month due to the exigencies of retirement.

Gordon O. Wilber of Oswego State Teachers College and Franklin J. Keller, principal of the Metropolitan Vocational High School, New York City, have long made significant and scholarly contributions to their respective fields of industrial arts and of vocational education.

We salute them on the completion of their current assignments and wish them good health as they move into whatever activities challenge them.— *L. W. P.*

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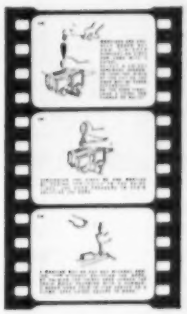

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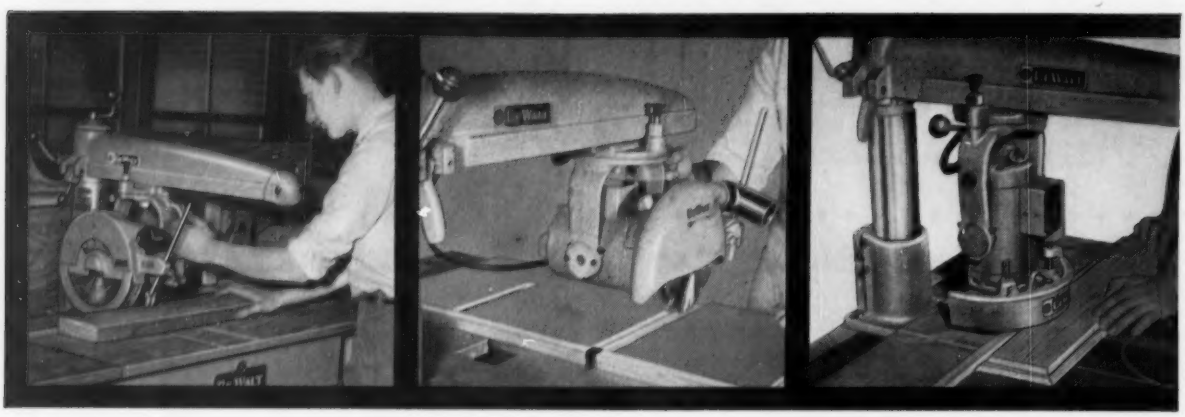

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Model	Std. Saw Blade	H.P.	Motor 3425 R.P.M.
GAK	12"	2	Single-phase, 60-cycle AC, 115/230 volts
GAN	14"	3	Three-phase, 60 cycle AC, 220/440 or 550 volts
GAO	14"	3	Three-phase, 60-cycle AC, 115/230 volts
GAR	14"	5	Three-phase, 60-cycle AC, 220/440 or 550 volts

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Model	Saw	H.P.	Motor 3425 R.P.M.
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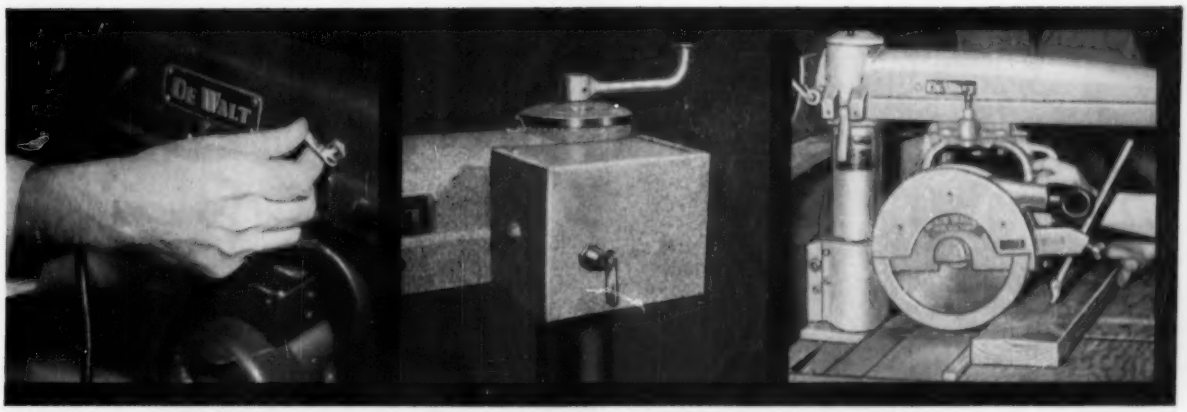

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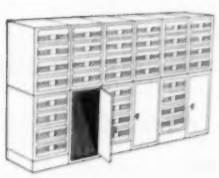
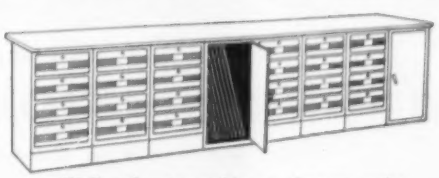
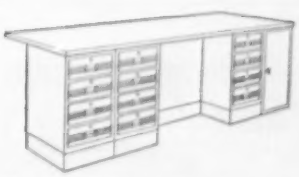


2-high section of service units. Has 36 drawers, holds 36 boards.



Wall reference table—6 drawer units, 2 drawing board units hold 24 boards.



Planning table—3 drawer units, 1 drawing board unit for 12 boards.

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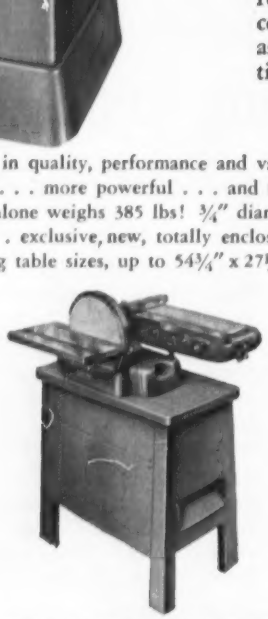

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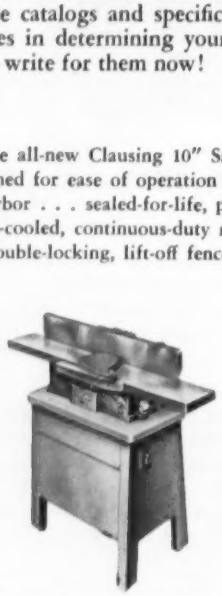

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The Challenge of Automation to Technical Education

By Glade Wilcox

Associate Professor of Industrial Technology, Western Michigan University, Kalamazoo

AUTOMATION in industry has become inevitable with the advancement of communication and control in industrial processes. Communication makes programming possible. Programming is telling the machine what to do with the raw materials in turning them into a finished product. Control is the building of mechanisms into the machine which will check the quality and quantity of the output and make corrections to compensate for deviations from standards. When programming and control, along with materials handling, operate without the intervention of human minds or hands, automation is being used.

Automation is no longer an infant industry. It has been estimated that four billion dollars worth of equipment for control will be purchased this year. It is predicted that 12 million clerical and production-line workers will find jobs connected with automation within the next ten years. Programming and control equipment and systems that were purchased in 1956 bolster an already incredible array of complex, highly specialized, measurement and control equipment already being used throughout business and industry.

The military forces, since the jet and atomic age have arrived, have been the prime customers of automation devices. Guided missiles are an automated device. The *K* system of aircraft control, which takes a plane off the ground, flies it to a target, takes evasive action, drops the bomb, fires the gun, and lands the plane, all without human guidance or control, is another application of automation. SAGE with its tie-in with "the DEW line," "the FROST line," and "TEXAS TOWERS" is automation to the nth degree because of the innumerable varieties being presented to the equipment at the same time.

To users of these devices, the pressing question is: Where will the trained personnel come from to install, maintain, and operate these new systems? And with the shortage of scientists and engineers that has already become a threat to our national security and economic progress, how can we continually supply the demand for more, newer, and better automation devices?

Subdividing Work

From this need and these limitations can be derived the first implication. *Industry can help alleviate the trained-manpower shortage by subdividing the scientific and engineering work into more specialized jobs for which training can be given in less time.* This is not a new idea. Prior to World War II, machinists were hired by industry to do the work that machine operators were doing during the war. Scientific and engineering personnel have opposed this move in the past because of the necessity for interdependent sciences in automation devices. However, during recent years new social-psychology devices have been developed which can be used to help solve this problem.

One of the most promising group techniques developed recently which is applicable to increasing the breadth of a group of specialists is *operations research.* This technique uses specialists as well as nonspecialists who serve as expediters, moderators, and catalysts in committees for progressive planning and development. Thus, by exchanging ideas and plans, the technical specialist begins to see the interdependence of the sciences and their own problems in light of other problems. Soon several technicians are doing what an engineer has done and another shortage has been eliminated.

Electronic equipment at Lockheed Missile System Division, Van Nuys, Calif., changes a tape recording of scrambled tones to decks of punched cards which plotter in foreground uses to make graphs. From these graphs scientists and engineers can interpret a missile's flight performance.

The second implication is significant to both industry and education. It is reasonable to assume that before specialized training can be given, communication must exist between the place of need and the place of training. The new jobs created by automation should be defined for the worker and the trainer, who must become acquainted with the nature of the new jobs. This is a function of industry and of the labor unions involved. This information must be brought to the employe level so that employes can, perhaps for the first time, see what automation will mean to them.

Needed: Advisory Committees

Having acquainted the employe with the information concerning new jobs, it now becomes the responsibility of industry to assist in making training possible. It is the function of the school to provide this training. Thus, the second implication: *Advisory committees must be used by school and industry to plan, organize, motivate, and control technical education.*

The third implication results from the nature of the growth of automation and the organization of the public school. Automation is not revolutionary; it is evolutionary. Automation is built on progressive, step-by-step upgrading of both manufacturing operations and skills. The next step beyond mechanization, where mass production is the result of the driven machine and the simple conveyer, is the introduction of increasingly complex controls and materials handling equipment. This is known as the automatic stage.

After this comes automation or the grouping together of many automatic stages with transfer devices into systems and the systems into the automatic factory. This process is a long and challenging development problem. Manual, direct-labor work is progressively transformed into work which will be cleaner, easier, safer, and more rewarding to the worker. In terms of the number of men required to produce a product, the reduction is a temporary displacement. This displacement can be offset by the demands of a broadening market as well as by the creation of new industries. Old hands must acquire new or reoriented skills.

Traditionally, the purpose of public schools has been to educate the masses. Skills have been taught in the elementary and to some extent in the secondary schools. Now the high school is confronted with a new challenge—offerings in science and mathematics must be improved and presented to more students. The emphasis is on the development of basic skills in the secondary schools before studying courses necessary to understandings for automation in the post-high school. Thus the third implication: *The upgrading of workers with the necessary skills and the training of new workers for technical positions in an automated industry must be given in a post-high-school level of education.* The area school, the technical institute, the junior college, the community college, and facilities of the senior college and university must be used for this training.

With the advent of automation and a vastly increased technology, our democratic way of life has become more interdependent. As our interdependence increases, our need for social understandings as well as knowledge of methods and techniques for resolving social conflicts increases.

With more interdependence, family life moves away from a selfsustaining level and, as a result, children have fewer responsibilities. Automation also means changes in occupations and employment. Hence there exists a need for flexibility of skills and content. These three factors of (1) need for more social understanding, (2) need for flexibility of skills, and (3) children with fewer responsibilities, necessitate education with continuous re-examination and construction of our social ideals, beliefs, and institutions; re-examination of adult education; and curriculum content designed to prepare the young to live in our evolving industrial technological society.

Delimiting Objectives

The fourth implication is concerned with delimiting our objectives. *These objectives must (1) be conceived in terms of the evolving social circumstances, (2) lead toward the fulfillment of current and basic human needs, (3) be consistent with democratic ideals, (4) be internally consistent, and (5) be capable of reduction to behavioristic terms.*

The remaining implications are a result of a series of studies made by the writer to determine progress in training for automation. The initial study was made in July of 1953 of 33 United States industries. From this report, ten companies which reported automation installations were selected, and ten additional companies were added, all of which had publicly announced automation installations. A second study was made of these 20 companies in May, 1954. The third study was made in November, 1956, of the 20 companies studied in 1954. This data seemed to show that the ratio between technicians and engineers is remaining about the same—two engineers to five technicians. This would seem to indicate that *additional training facilities need to be provided for technical education.*

This is the fifth implication: *Technicians are needed to keep operating for users the equipment designed by engineers and built by engineers and technicians.* A corollary would be that *as more automation equipment is built, the ratio of technicians to engineers should increase.* This would prevent the plowing back of engineers into technical work.

More Technical Training

The study has also shown that there is a marked increase in the number of schools-within-industry organized by automation manufacturers. These schools run from two days to two weeks, are mostly tuition free, are staffed by graduate engineers, some of whom are trained to teach, and enrolment is closed long before the classes start. Since these schools are pointed toward "customers' " demand for information, this leads to the sixth implication: *The public schools should assist by providing more technical training facilities, teaching personnel, and an organized curriculum with a measure of control over the content.*

The industrial survey has also indicated that technicians working with engineers must be trained in basic science and mathematics courses with pre-engineers. This is also verified by one of the unwritten laws of curriculum construction—the level of instruction in a class is determined by the individuals in a class. Trade and industrial education of less-than-college grade has traditionally fought the "dumping-ground" battle in related science and mathematics courses. These related courses were for their students only; and, if undesirable students were "dumped" into these classes, the instructional level dropped. Where these students had to compete with students in classes requiring an academic level for achievement, in contrast to a skill level for achievement, a better product was produced. The seventh implication is that *technical students in related science and mathematics courses should compete with pre-engineers during their less extensive training.*

Finally, the industrial survey has shown that there is developing a level of training above the trades and below the engineering level. This has been recognized by engineering societies and

(*Continued on page* 11)

(Continued from page 10)

management but too many public-school educators have conceived of technical training as upgraded trade training. This upgrading program still utilizes jobs and projects for shop methods of instruction. *The nature of method in the major technical courses must be directed toward developing original thinking and malfunction diagnosis, rather than trial-and-error applications.* This is the eighth implication and it necessitates the laboratory method of teaching rather than the job or project type that is used in trade and industrial education, or the demonstration-analysis or laboratory-workbook method currently found in engineering schools. This means that the student is taught to prepare a technical report, fully written, rather than checking blanks on a prepared sheet or filling in curves on a piece of graph paper.

In Summary

To summarize some of the implications resulting from the increase in automation to technical education:

1. Industry can help alleviate the shortage of trained manpower by subdividing the scientific and engineering work into more specialized jobs for which training can be given in less time.

2. Additional training facilities need to be provided for technical education, for as more automation equipment is built, the ratio of technicians to engineers should increase.

3. The upgrading of workers with the necessary skills and the training of new workers for technical positions in an automated industry must be given in the post-high-school level of education.

5. The objectives of technical education must include the following: *(a)* be conceived in terms of the evolving social circumstances; *(b)* lead toward the fulfillment of current and basic human needs; *(c)* be consistent with democratic ideals; *(d)* be internally consistent; *(e)* be capable of reduction to behavioristic terms.

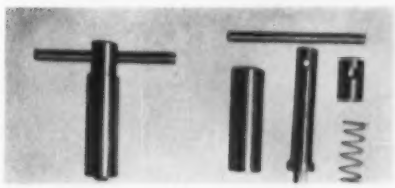
6. Advisory committees must be used by school and industry to plan, organize, motivate, and control technical education.

7. Technical students in related science and mathematics courses should compete with pre-engineers during their less extensive training.

8. The nature of method in the major technical courses must be directed toward developing original thinking and malfunction diagnosis rather than trial-and-error applications. ★

◀ **No danger of this**

If you make this ▼



Self-Ejecting Chuck Key

By Charles Krause

Red Bluff, California, High School

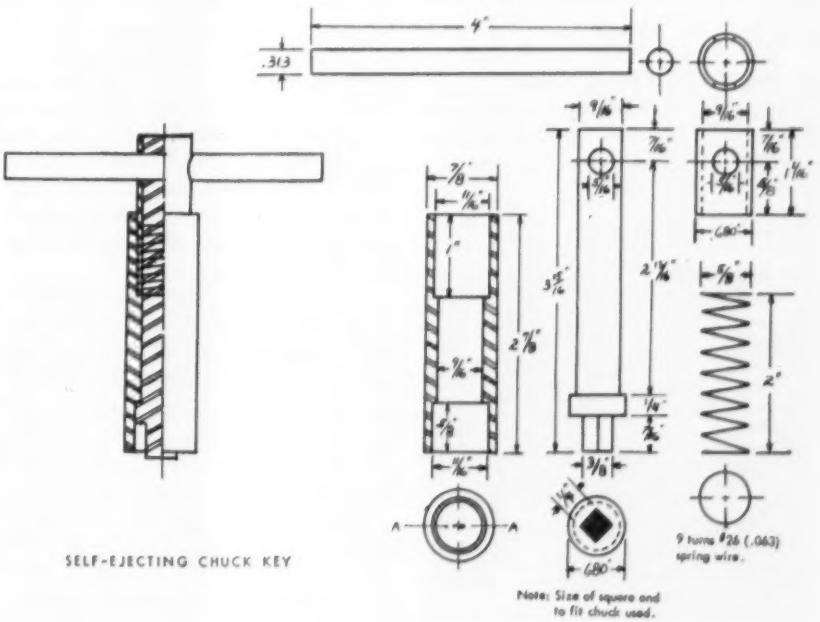
NO more flying chuck keys in the school shop will happen if this self-ejecting key is used. The spring action of the key automatically pushes it from the lathe chuck when the operator removes his hand. It literally takes out of the operator's hands the possibility of accidents occurring through carelessness.

Simplicity of design, plus tamper-proof assembly of the key, eliminate the necessity of repair or adjustment, thus making it ideal for school-shop use.

By varying the size of the squared end, the key can be made for any size lathe chuck without affecting the operation of the key. Sufficient hardness of the squared end can be obtained by tempering it to a dark straw color.

The chuck key not only serves a useful purpose in the shop but also provides experience in lathe and milling-machine work. The machining and assembly of the key are simple enough for a beginning student to accomplish and, at the same time, cover a wide range of machine-shop operations.

Readily available mild-steel round stock is used to make the project and all parts for the key can be made in the school shop, including winding the spring on the lathe. ★



SELF-EJECTING CHUCK KEY

The condenser unit fits easily on the bottom of the regular press camera flash gun and will set off as many as ten flash bulbs at one time.

A simple condenser makes possible

Multiple-Flash Photography

By Harry J. Miller

Sarasota, Florida; formerly Philadelphia, Pa., Schools

THE average high-school photography shop frequently has a regulation or modified version of a press camera similar to those used by professional photographers. Use by students of such a camera invariably lends depth to the value of the training given, if the students have been given careful instruction and have been selected because of their genuine interest.

Assigned to "cover" subjects around the school, the student entrusted with the big camera is naturally mindful of his responsibility and quite conscious of the respect accorded him for his proficiency as an amateur "shutterbug." But maximum use of such a fine solenoid-equipped camera cannot be made because of its inability to fire a number of flash bulbs simultaneously.

Advanced students need to know the technique of avoiding flat lighting, particularly when large groups or areas are involved, by aiding the "shot" through stringing some wire and several additional bulbs around before tripping the shutter.

The teacher is faced with the problem of purchasing from limited funds an expensive, commercially-built B-C unit to provide the added voltage boost required for multiple flash. The electrical load on the camera's batteries imposed by the solenoid, the extra bulbs, and added wire footage is usually beyond their capacity to handle without such a B-C unit.

An economically and simply-made condenser unit such as the one described here permits normal solenoid operation (which will fire two or three flash bulbs simultaneously) plus the use of ten or more bulbs hooked up in parallel over a circuit embracing 200′ or more of wire.

The simple conversion of the voltage, with the help of a condenser, eliminates the need for the expensive B-C pack or the costly replacement or conversion of the solenoids. This device avoids what is often a greater problem—the purchase of a camera with internal synchronization (built-in sync).

Addition of the capacitor (condenser) provides a booster to counteract the voltage drop along the wire network and offsets the weakened output of the camera's flash-gun cells each time the solenoid shutter is tripped.

The condenser's action, after having been connected for a few seconds, is to store a charge from the 4½-v battery supply in the regular flash gun. It is this charge which fires the bulbs without affecting the normal operation or voltage of the solenoid. Only a few seconds of waiting after firing suffices for recycling for the next shot.

This 6-v, d-c, 2000-mfd condenser is built into a two-battery flashlight case that is twisted onto the bottom of the camera's flash gun case as shown in the photograph. The flashlight case spring is soldered to the interior of the case so that it will compress the batteries in the flash gun.

The negative terminal of the condenser is soldered to the spring or the case while the positive terminal is spaghetti covered and soldered to the female plug mounted in the base of the extension tube. Only one wire in the cord is used.

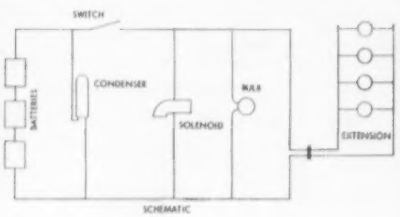
The male plug hooks up to one end of the connecting cord that plugs into the camera gun's "shutter" outlet.

The end of the flashlight case is drilled and reamed to receive the female plug which is fastened with two small self-tapping screws. The male and female plugs are polarized to insure correct polarity. Be sure to maintain correct positive and negative connections.

To test the booster, connect it to the flash gun, wait a few seconds, remove the batteries, then fire a bulb. It should fire from the stored voltage charge in the condenser. If it does, the batteries may be replaced for regular operation. If the bulb won't fire from the charged condenser, check the polarity of the circuit and components.

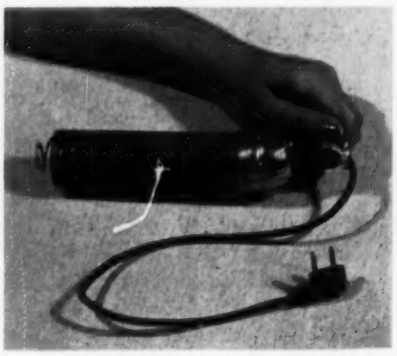
This condenser, in its role as a voltage booster, greatly extends the use of the press camera for multiple flash as well as widening the horizon of school photography at a pennies-price for the conversion. The technique of setting up for pictures of better character may well inspire among students the desire to pursue photography as a most gratifying hobby or career. ★

The parts required are easily secured and cost about two dollars for sockets and condenser.



SCHEMATIC

The end of the case is spread slightly so it will make a snug screw fit on the flash gun.

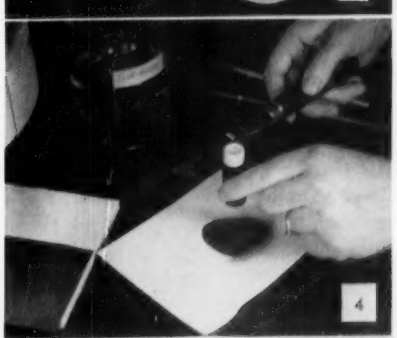


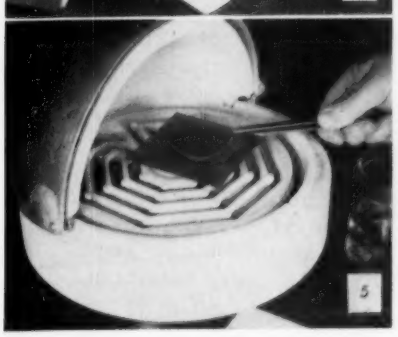
Finish out the year with

Copper Enameling—It's Fun!

By Vernon D. Seeley

Former Instructor, Livingston Manor, N.Y., Central School





COST and convenience—particularly at this time of year—make copper enameling a handy teaching device. With most of your major units out of the way, this fascinating craft would be a good way to finish out those last few shop classes.

Copper enameling fits well into either a metal, ceramic, or general-shop program. It will give the student a chance to perform several processes, such as the use of tin snips, filing, scroll or jeweler's saw, and polishing and soldering.

The cost isn't prohibitive either. The kiln, probably the most expensive single item needed, can be purchased for anywhere from $5.00 to $25.00. In addition, further economies can be cited, such as the use of scrap copper and that a good many items needed are already in the shop.

To get started you will need an enameling fork or tongs; a screen; 18-gage copper (scrap, if you please); asbestos padding; steel wool; a solution of salt and vinegar (a tablespoon and cup respectively); copper enamels (flux); lumps and threads of colored, decorative materials; gum arabic; tweezers; spatula; and brushes (Fig. 1).

The first thing to do is to cut out the desired copper shape to be enameled. Either a jeweler's saw or jig saw (Fig. 2) can be used. The variety of shapes is limited only by the creative abilities and imaginations of the students. Then prepare the copper for enameling by smoothing the edges with a file and cleaning it thoroughly with steel wool. Next, dunk the piece into the salt and vinegar solution, rinse in clear water, and dry. Then coat it with gum arabic.

Now, carefully sift clear enamel (flux) on the copper shape (Fig. 4) and place it on the screen and pop it into the kiln (Fig. 5) that has been preheated to 1300° to 1400° F. As a safety measure—this is a hot item—be sure to have the students use a fork or tongs when doing this.

While the copper shape is in the kiln, the student must pay strict attention to what is happening to it. As soon as the enamel melts, producing a smooth, mirror-like surface, it has to be promptly removed from the heat. (If left in too long, the edges will burn. Depending on the temperature, this step should take from two to five minutes.) Set the piece of work on an asbestos block to cool. (A scale will form on the back side of the copper but will pop off when it cools sufficiently.)

Now, drop the project into the vinegar and salt solution again; rinse and dry thoroughly. This completes the base coat.

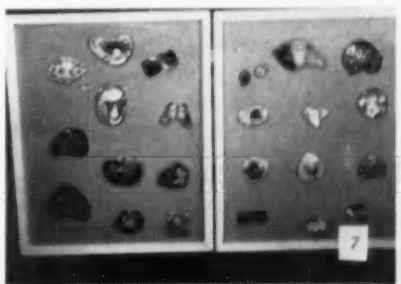
From here on, the work can get as fancy as the student's imagination dictates. Some colored enamel can be sifted on (same technique as in Fig. 4). By painting designs with gum arabic and sifting colored enamel over the entire piece, nifty patterns can be created. The colored enamel sticks to the gum arabic and by blowing lightly on the enameled piece, superfluous enamel is whisked away. Fire again (Fig. 5), place in solution, rinse, and dry. Decorate further with the lumps and threads (Fig. 6) and keep repeating the firing process.

After the last firing, clean the piece with steel wool and polish. The student can make a smart variety of items by soldering clasps and pins on the backs of pieces of enameled copper (Fig. 7). These items can range from cuff links to earrings. It's spring, you know.

For references, I suggest:

Enameling, Principles and Practice. Kenneth F. Bates. New York: World Publishing Co. $3.95. A complete text on all types of enameling.

Copper Enameling. Columbus, Ohio: Professional Publications, Inc. $2.00. Compiled by the staff of *Ceramics Monthly Magazine.* ★



A healthy balance is needed between

Divergent Views on Industrial Education

By T. A. Hippaka

Professor of Industrial Education, Iowa State College, Ames

IN *This Week Magazine* of October 14, 1956, appeared the article, "School Didn't Give Us What We Want," by Jack Stewart. The author has based this story on a study of 5000 young people between the ages of 17 and 22 by Gilbert Youth Research Co. The people included in the study were boys and girls who had graduated from high school and who represent the nearly 80 percent who have not graduated and will not graduate from college. Jack Stewart is not the first person, nor will he be the last, to call this situation to the attention of the American public.

Dr. Charles Prosser, in the famous resolution of some years ago, attempted to bring educators to their senses when he made it clear to them in no uncertain terms that approximately 80 percent of America's youth never go to college. High school, therefore, constitutes their last full-time opportunity for an education—their preparation for life.

Naturally, the ultimate in a complete education is a healthy balance between general education and specialization. President Eisenhower has stressed this sound concept in these words: "In this country we emphasize both liberal and practical education. But too often it is a liberal education for one and a practical education for another. What we need is general education, combining the liberal and the practical, which helps a student achieve the solid foundation of understanding—understanding of man's social institutions, of man's art and culture, of the physical, biological, and spiritual world in which he lives."

Less than a year ago the Committee for the White House Conference on Education recommended that schools should continue to develop the following:

1. The fundamental skills of communication—reading, writing, spelling, as well as other elements of effective oral and written expression; the arithmetical and mathematical skills, including problem solving. While schools are doing the best job in their history in teaching these skills, continuous improvement is desirable and necessary.

2. Appreciation for our democratic heritage.

6. Effective work habits and selfdiscipline, knowledge of American institutions.

4. Respect and appreciation for human values, and for the beliefs of others.

5. Ability to think and evaluate constructively and creatively.

6. Effective work habits and self discipline,

7. Social competency as a contributing member of his family and community.

8. Ethical behavior based on a sense of moral and spiritual values.

9. Intellectual curiosity and eagerness for life-long learning.

10. Aesthetic appreciation and selfexpression in the arts.

11. Physical and mental health.

12. Wise use of time, including constructive leisure pursuits.

13. Understanding of the physical world and man's relation to it as represented through basic knowledge of the sciences.

14. An awareness of our relationships with the world community.

It could be said that these objectives stress the development of the intellectual powers of youth to the limit of their capacity. The so-called practical education or preparation for a vocation is not singled out as such.

When the 5000 young people were asked to indicate what they would want their offspring to take in high school, they seemed to indicate those subjects in which they thought they had been "short suited" when they attended high school. English, spelling, mathematics, commercial subjects, and mechanical work were rated very high. Whether we like it or not, preparing for and securing a job on graduation from high school loomed large in the minds of these people. Strange as it may seem, only 9 percent specified homemaking, an ultimate and inescapable activity for most humans, if there ever was one.

Balance between general education and specialization has indeed become a real problem in America. The ever-increasing complexity of our society and the demanding workaday world in which people make a living cannot be denied. Where people have the time, money, and intelligence, it is not only possible but imperative that people secure the so-called balanced preparation between general education and the ability to make a living.

Some there are who must go to work after high-school graduation or even before. They have no alternative. General education, as far as they are concerned, may have to be cut short in order that the learner may concentrate on subjects that will prepare him for earning a livelihood as soon as possible.

Employers are interested in prospective employe attitudes. Poor attitudes brought into the plant can breed no end of trouble. They must have workers who really want to work for a good reason. Employers have every right to expect an honest day's work from everyone. While tenure, retirement, and vacations are matters of great importance, they should not become the most immediate concern of prospective employes. The reason why one wants to work must encompass more than buying an automobile and having fun. While a man has a perfect right to possess these, he needs to think in terms of selfimprovement for greater service in his occupation, a home, family, church, schools for his offspring, and, service to his community and country. He does his level best to understand the world in which he lives. Where a man cannot be loyal to his employer, he should seek another job. He should be sold on the product that his company manufactures. He should realize the importance of his company and its product to the community, and take a personal interest in all three.

Competition between manufacturers is so keen today that no factory can stand still in its modernization if the entrepreneur expects to stay in business. It naturally follows that no employer can afford to employ workers who are satisfied to remain dormant in their own development.

Whatever merit there was to the

(Continued on page 22)

You, too, can be a curlicue expert in carving leather when you

Design It Yourself

By Paul C. Hoopes

Abraham Clark High School, Roselle, New Jersey

Original leaf and flower designs for leather carving. Each leaf shown counts twice. First it is used as a "right-hand" leaf, then it is turned over and used as a "left-hand" leaf.

IT is one thing, I have discovered, to say that you don't like the ready-made designs for carved and stamped leather work because they lack any element of your personality. It is something else to try to originate your own design. You are apt to find that you are just "fresh out" of ideas, and nothing good comes of the effort. The frustration can drive a fellow nuts.

Some time after I started to try to learn how to carve leather, I began to make inquiries concerning the significance of all the curlicues. One person said, "Water plants." Another said, "Ferns." And someone else said, "You'll never know; you've got to be drunk to think up these things." This seemed to be getting to the heart of the situation, but sounded expensive even if pleasant.

No one had any suggestions to make that would enable me to get results with my feeble ability. Then, when it seemed like I was going to develop a complex, I discovered something I should have recognized earlier: the designers of abstract curlicues used nature for their source of inspiration. Could it be that I, too, would find an inspiring shape in nature? Sure enough, some very simple but beautifully-shaped leaves were discovered in a corner of a woodland fence. Fortunately the urge to pick a handful of these leaves was stifled in the nick of time—they turned out to be poison ivy.

You don't get a rash, however, from *sketching* poison-ivy leaves. I proved it conclusively. This may be classed as either a scientific or artistic conclusion, depending on your personal attitude toward poison ivy. Anyway this seems to be the first and only use man has found for the stuff. It does offer some fine shapes for leather decoration, and by the time you are done arranging it on paper it no longer looks like poison ivy.

The procedure is simple. Sketch a half dozen or more leaf shapes on thin cards (such as old postal cards). Cut these out carefully, then arrange them in a pleasing sequence on your pattern paper, drawing in the stems and vines as you build up the pattern of traced leaves.

For a flower in the decoration, I used a variation of the dogwood flower. Of course dogwood flowers don't grow on poison ivy, but they should. The way I drew mine, with five petals instead of four, they did a lot for the poison ivy. I drew two or three variations and sizes and slipped one in here and there.

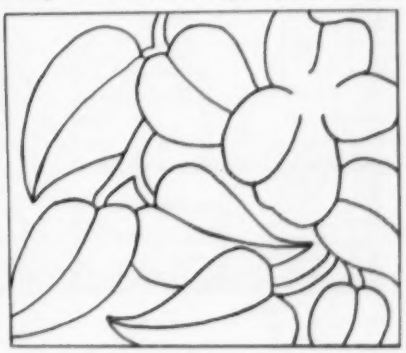
Speaking of variations, it seems that much of the success of this trick is in the scope of variety. Big leaves, middle-sized leaves, and little leaves all should be at hand to create a pattern resembling the handiwork of nature.

I soon discovered that too much background is not good—and too much of the pattern is not good. The happy balance that gives both background and pattern their maximum effectiveness is a matter of taste and experience.

Maybe you won't make a pleasing design the first few trys. Maybe you will. Of one thing you may be sure: a usable, pleasing, and worthwhile decorative design will finally result if you play with the "makings" for a reasonable length of time. If I can do it, anyone can, for, truthfully, I'm no hand at abstract designing. I couldn't design a flapjack if it didn't get round on the griddle. ★

The leaf and flower design on the completed trap shooter's shell box and shoulder bag.

Design for the front of trap shooter's shell box.



Theory turns into reality when

Students Plan a School Shop

By Lawrence M. Frederick

Chairman, Industrial Education Department, New Mexico Western College, Silver City

STUDENTS in the course "Industrial Arts 366" at New Mexico Western College, Silver City, normally plan and lay out a theoretical general shop as part of the class activity. Last year, however, theory turned into reality. Shops were planned by the students for actual construction as a part of an expanding industrial-education program of a southern New Mexico school.

Early last year the administrative staff of Gadsden Consolidated School in Anthony, New Mexico, visited the college campus to seek at least tentative answers to some of the problems they were meeting in attempting to mold an efficient industrial-education plant in their senior-high school. The Industrial-Arts 366 class assumed the task of suggesting solutions to these problems.

In the belief that the results of this activity might be of some aid not only to the young teachers who will soon be taking their places in the secondary schools of today but to other teachers now planning new shops, the shops planned by the students are shown here. One of the shops, the automotive shop, is now under construction. The composite general shop is expected to be started soon.

In analyzing the Gadsden situation, two features became evident: a composite general shop was a must, and a general automotive-mechanics shop, with facilities for both industrial arts and T&I work, was desired at this time. In order to facilitate matters, the class divided itself into two parts, with one

Equipment planned for the areas in the Gadsden, N.M., general shop include:

Area A. Woodworking and Plastics: *1*—wood racks, 36″ x 15′; *2*—work benches, 22″ x 52″; *3*—jointer, 6″; *4*—circular saw, 8″; *5*—sanding table, 4′ x 6′ and disc sander, 10″; *6*—band saw, 14″; *7*—wood lathe, 6″ radius; *8*—jig saw, 30″; *9*—wood tool cabinet, 24″ x 5′; *10*—drill press; *11*—wood scrap box, 24″ x 48″.

Area B. Crafts: *12*—work bench, 45″ x 8′, two looms; *13*—leather and textiles tool cabinet, 24″ x 48″.

Area C. Transportation and Power: *14*—outboard motor stand, 2′6″ diameter; *15*—work bench, 30″ x 15′, storage under; *16*—engine stands, 18″ x 30″; *17*—chassis, 7′ x 14′; *18*—general automotive and metals bench, 4′6″ x 8′, storage under; *19*—grinder, 15″ x 24″.

Area D. General Metals: *20*—metals tool cabinet, 24″ x 5′; *21*—anvil, 10″; *22*—arc welder; *23*—oxyacetylene welder; *24*—welding tables, 36½″ x 36½″; *25*—metal lathes, 13″ diameter; *26*—metal bench, 42″ x 8′, storage under; *27*—sheetmetal bench, 42″ x 8′, storage under; *28*—shaper, 7″; *29*—foundry table, 36″ x 5′; *30*—crucible furnace; *31*—foundry bin, 36″ x 36″.

Area E. Electricity: *32*—work bench, 54″ x 8′, storage under.

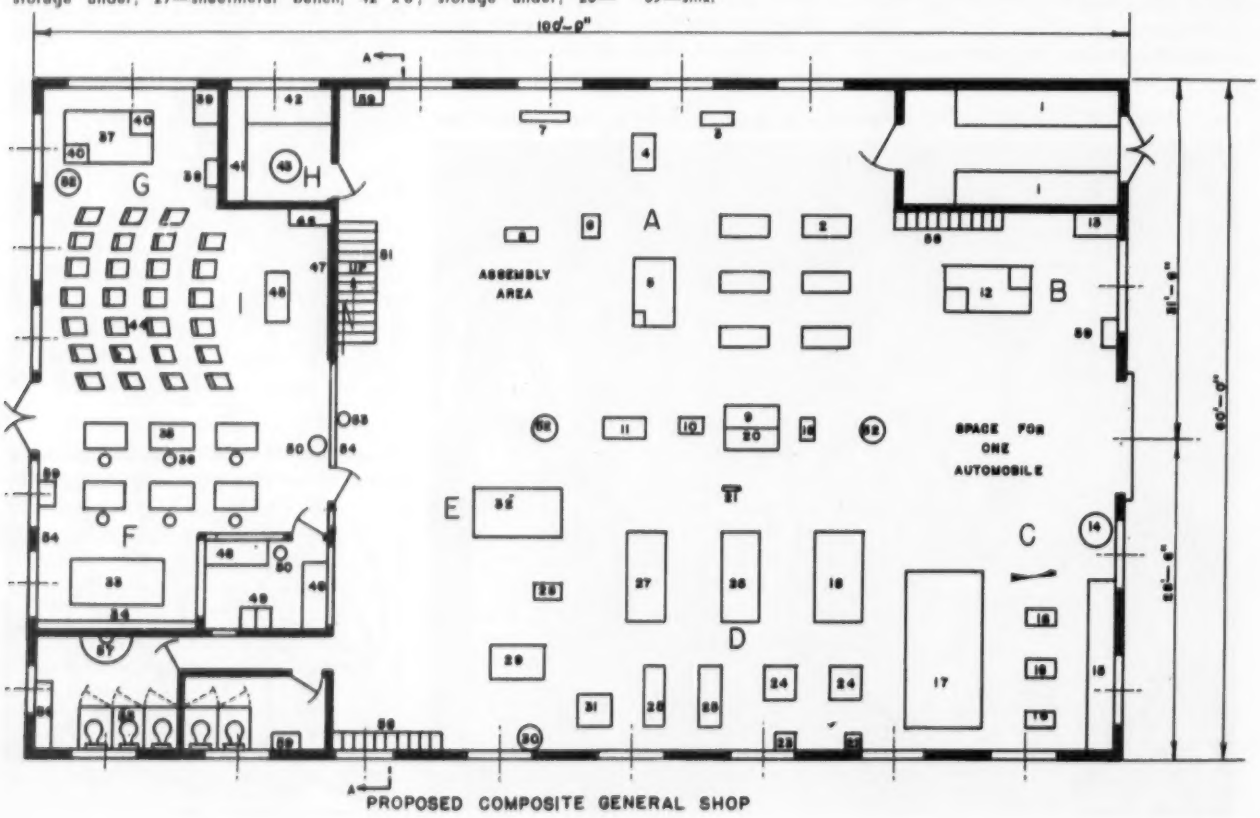
Area F. Drawing and Planning: *33*—planning table, 30″ x 4′; *34*—book shelf, 10″ x 14′; *35*—drawing tables, 30″ x 4′; *36*—adjustable stools.

Area G. Graphic Arts: *37*—work table, 54″ x 8′; *38*—proof press; *39*—imposing table (steel), 37″ x 39″; *40*—hand press.

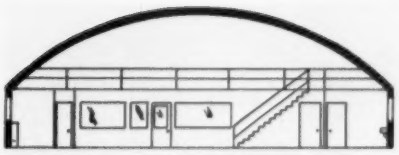
Area H. Finish Room Area: *41*—storage cabinet, 24″ x 10′; *42*—finish bench, 3′ x 8′; *43*—step-on can.

Area I. Classroom Area: *44*—student desks; *45*—demonstration desk, 24″ x 52″; *46*—storage cabinet, 18″ x 4′; *47*—chalkboard and movie screen.

General and Miscellaneous: *48*—office desks, 29″ x 6′; *49*—file cabinets, 18″ x 2′; *50*—waste baskets; *51*—air compressor; *52*—mobile waste cans; *53*—drinking fountain; *54*—bulletin board, 24″ x 4′ *55*—toilets; *56*—urinal, 18″ x 6′; *57*—wash fountain (semicircular), 54″; *58*—lockers (40); *59*—sink.



PROPOSED COMPOSITE GENERAL SHOP



SECTION A-A

group developing plans for the automotive shop under the guidance of Robert Nesbitt, associate professor of industrial education. The second group undertook the assignment of developing plans for the composite general shop under my direction.

The Gadsden secondary school, with an enrolment of 500, is located in a predominately agricultural area of the state, north of El Paso, Texas. The area is one of rather heavy population—heavy, at least, for New Mexico. Money for expansion purposes here, while important of course, is not quite the problem it is in other parts of the state. So, on the basis of student need, reasonable finances, the wishes of the school district itself, and adherence to certain rules of shop layout and organization, the plans shown here were developed by the class.

The composite general shop, to be housed in a separate building connected with existing school buildings by a covered breezeway, was planned as a two-instructor shop. Control over the space and the many varied activities would be far too much for one individual to supervise. A class of 42 students can be accommodated in the seven instructional areas.

It will be noted that certain pieces of equipment in the general shop can be used in more than one instructional area. For example, the variable-speed drill press and the grinder are located so as to be available to both the general-metals and the woodworking areas. This dualism is possible since only general-shop classes will be held in the building. Unit classes are not to be scheduled.

The wood-storage room can also be used for additional metals storage if necessary, although provision has been made for metals storage under the work-benches.

The planning area, classroom section, and graphic-arts area are located away from the rest of the shop, yet they are still an integral part of the shop set-up. These relatively dust-proof areas can be easily supervised because of the extensive use of glass.

The shop air compressor can be conveniently located beneath the stairs, which lead to an overhead project- and surplus-material storage area. Toilet facilities are provided for both boys and girls.

In the automotive shop, provision has been included for the removal of exhaust gases through an under-the-floor duct system. Classroom space has been pro-

(*Continued on page* 20)

Area A. Electrical and Tune-up: 1—spark-plug service machine, 18″ x 15″; 2—bench (wooden with steel top), 2′ x 16″, 3′ high; 3—machinist's vise, 6″; 4—generator and regulator tester, 39″ x 30″; 5—motor tester, 24″ x 33″; 6—distributor tester, 24″ x 33″; 7—stall, 26′ x 8′.

Area B. Front End Alignment: 1— stall, 14′ x 8′; 2—pit, 12′ x 13′, 30″ deep; 3—brake and drum lathe, 24″; 4—wheel balancer, 18″ x 39″; 5—bench (wooden with steel top), 2′ x 4′, 3′ high; 6—machinist's vise.

Area C. Office: 1—office desk, 29″ x 6′; 2—desk chair; 3—two file cabinets, 18″ x 2′; 4—typewriter table, 21″ x 2′.

Area D. Tool Crib: 1—tool cabinets, 2′ x 13′, 3′ high; 2—Dutch doors (2), 3′ x 7′. (Note: Tool panels slope from front end of tool cabinets to ceiling.)

Area E. Lecture: 1—circular stairs. (Note: Circular stairs lead to lecture area above office and tool crib.)

Area F. Engine Display: 1—overhead valve in-line (Chevrolet); 2—overhead valve V8 (Oldsmobile, Chevrolet, Studebaker, or Ford); 3—L-head valve in-line (Plymouth or Dodge); 4—L-head valve V8 (Ford); 5—exhaust floor outlet, 6″ x 6″; 6—reference bench, 18″ x 5′, 3′ high; 7—outside door, 4′ x 8′.

Area G. Storage: 1—double doors, 3′6″ x 7′. (Note: Storage area should be equipped with steel racks for miscellaneous parts storage.)

Area H. Cleanup: 1—circular wash fountain, 4′; 2—built-in double steel lockers (15); 3—urinal, 12″ x5′; 4—shower.

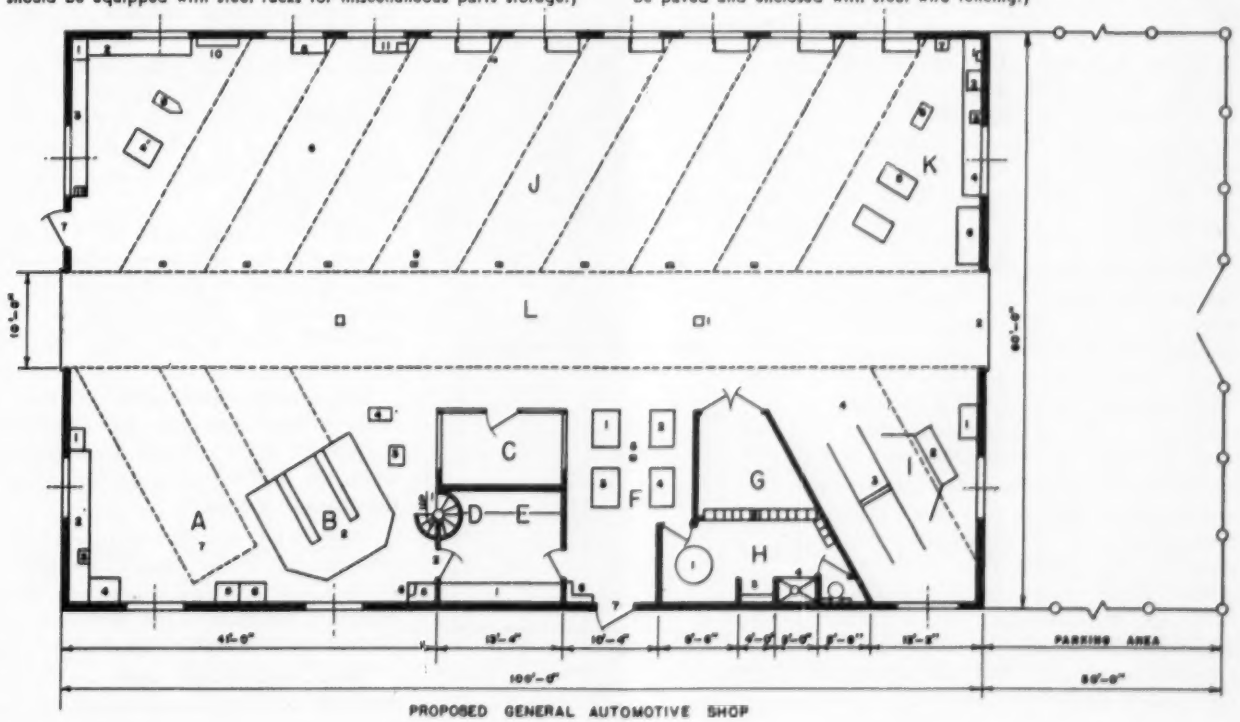
Area I. Wash and Grease: 1—parts cleaning machine, 3′ x 3′ x 5′; 2—grease trap, 3′ x 6′; 3—hydraulic frame lift, 6000 lb. capacity; 4—stall, 12′ x 29′.

Area J. General Working: 1—air compressor (vertical); 2—bench (wooden with steel top), 2′ x 12′; 3—bench (wooden with steel top), 2′ x 14′; 4—tire iron man; 5—bench (with air and electrical outlets), 18″ x 4′; 6—stalls, 8′ x 29′; 7—outside door, 4′ x 8′; 8—63-pound anvil; 9—exhaust floor outlet, 6″ x 6″; 10—hydraulic press, 25-ton capacity; 11—machinist's vise, 6″ (8); 12—machinist's vise, 4″ (2).

Area K. Engine Rebuilding: 1—boring bar, 1′ x 1′; 2—valve grinder with rocker-arm grinding attachment; 3—piston-pin hone, 1′6″ x 2′; 4—bench (wooden with steel top), 2′ x 15′6″; 5—engine tables (2), 2′6″ x 4′; 6—lathe, 13″ x 5′; 7—drill press, 1/2″ capacity; 8—dual grinder, 1/4″ capacity.

Area L. Car Aisle: 1—floor drains (2), 12″ x 12″; 2—overhead doors with service doors (2), 10′ x 10′.

Area M. Parking: 1—locking gate, 12′ wide. (Note: Parking area should be paved and enclosed with steel wire fencing.)



PROPOSED GENERAL AUTOMOTIVE SHOP

Clips for the aerial and ground are shown above. Note clips for phones and ground are common and fastened by same bolt to chassis.

A plastic cup can hold a

Crystal Radio

By Dean Nordell

Worthington, Minnesota, High School

CRYSTAL sets in our shop have improved greatly in appearance and performance since all of the "ingredients" have been housed in a plastic cup. Gone forever are the unsightly cardboard forms and the wooden base with a Masonite piece on which to fasten the condenser and clips.

A colorful plastic drinking cup provides an ideal insulated form on which to wrap the coils and in which to drill holes for mounting the Fahnestock clips. Moreover, the inside diameter is correct for mounting the variable condenser.

Students are enthusiastic about this beginning project in radio. It provides actual experience in working from a schematic diagram to the completed project. They have experience in locating and drilling holes, in neatly winding the primary and secondary coils, and in soldering terminals. The satisfaction which a boy receives as he works with it is evident by his enthusiasm as he describes to other boys the stations he received during the week end. (I have one boy who has tuned in about 40 stations.)

Do not accept the circuit or specifications as outlined here as being the final word on crystal sets. Take plenty of liberties with this circuit—you may discover a set-up which works better in your situation. Try a fixed or variable condenser connected in series at point *A* in the diagram. Experiment with a varied number of turns in the primary and secondary coils to gain best reception and to tune your condenser to midpoint for the station most easily received. When connecting the variable condenser, try connecting one or both of the variable sections. By such experimentation you may find the correct capacitance needed for your set.

The construction procedure is as follows:

1. Make a metal template to locate the holes for mounting the variable condenser. Then locate and drill proper holes.

2. Locate and drill three ⅛″ holes for Fahnestock clips ½″ from edge and 1″ apart.

3. Drill one 1/16″ hole 2″ from open end of cup.

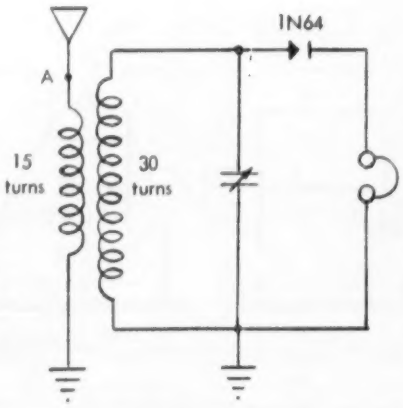
4. Insert 4″ of #28 wire through this hole (step 3) and wind 30 turns. At the end of 30 turns, drill another 1/16″ hole 180° from first and insert wire through to inside of cup. This takes about 24′ of wire. The wire will have a tendency to slip on the tapered cup so place plastic glue on the wire to hold it in place.

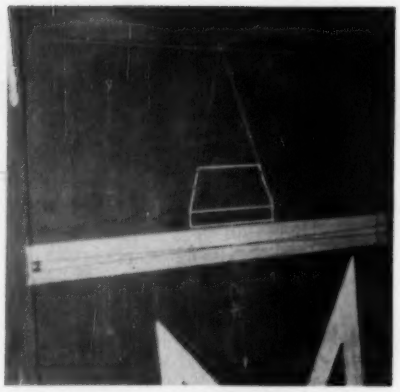
5. Repeat as above and wrap 15 turns of #22 wire on top of the first coil. If you desire, you may insert ends of wire through the same 1/16″ holes as for the first coil. Wire sizes may vary from those specified—try what you have.

6. Prepare and solder all connections.

7. Assemble and test. Good luck!

Parts needed are as follows: one plastic drinking cup; four ¾″ Fahnestock clips; three ¼″ stove bolts and nuts; three ⅝″ soldering lugs; 8″ #20 solid hook-up wire; 24′ #28 magnet wire (single cotton, enamel covered); 12′ #22 magnet wire (same as preceding or may be obtained from old speaker coil); three ¼″ condenser mounting screws; one midget two-section variable condenser; and one fixed crystal such as 1N64, 1N34, 1N51, etc. ★





This parallel straight edge makes the drawing of lines on the chalkboard a very easy matter.

Drafting Instruments for Chalkboard Use

By James E. Foster

McMichael Junior-High School,
Detroit, Michigan

DRAWING straight parallel lines on the chalkboard is difficult as any drafting or shop teacher knows. The problem is compounded when it is necessary to draw vertical lines and angles that are more or less accurate.

A shop-made parallel straight edge plus a couple of triangles and a protractor have simplified this problem for me. The parallel straight edge is 4′, 3″ long and is made of oak. The pulleys were machined from cold rolled steel. The straight edge can be adapted to any reasonable size, depending on the chalkboard. The cord for holding the straight edge should be strong and with a minimum of elasticity.

A 30°-60° triangle and a 45° triangle made out of ¼″ plywood are about two and a half times the size of normal classroom drafting instruments, as is the protractor which is also made out of plywood.

The accurate fabrication of these oversize instruments is an excellent project for the wood and metal shops while the drafting students can make the original designs.

This set of oversize instruments is used extensively for classroom demonstration and remedial instruction. Students can use them to put drawings, or portions of drawings, on the chalkboard.

These instructional aids are well worth the time spent in making them. ★

Student interest runs high when making this

Assortment Box

By Clifford Monsrud and Robert Porath

Rochester, Minnesota, Senior-High School

Neat and useful is this galvanized steel assortment box. Fabrication is either by riveting or by spot welding as here.

THIS assortment box was designed to attract the interest of students in the sheetmetal field by giving them a good take-home project which incorporates in its fabrication the use of various sheetmetal layout tools and the manipulation of most of the sheetmetal-forming machines.

This type of project gives an opportunity for the instructor to achieve such learning objectives as appreciation of design and metal layout, manipulation and care of layout tools, cutting, bending, and forming sheetmetals, selection of drill bits and proper methods of drilling, care and use of the spot welder, methods and techniques of soldering, knowledge of rivets and use of riveting tools, fitting and assembly of individual parts, knowledge and proper use of files, and understanding of sheetmetals as to their physical qualities, weights, proper uses, and importance in our daily life.

Standard sheetmetal-working procedures can be used in constructing the bin. The first side of the bin can be used as a template in making the remainder. The circular side should be hemmed on the burring machine or edger. Finish hemming can be done by hand hammering or by the setting-down machine.

Either spot welding or riveting can be used for assembling the boxes. The pull handle is made by inserting a 6-pound rivet in a 3/16″ hole in the front of the box and burring the rivet slightly. It is then soldered flush with the inside of the box. Solder the corner on the inside bottom front of the box to act as a bearing for the wire rod that forms the hinge.

The brake is used in forming the outside case with spot welding or rivets used for fastening. The mitered corners should be soldered and filed smooth.

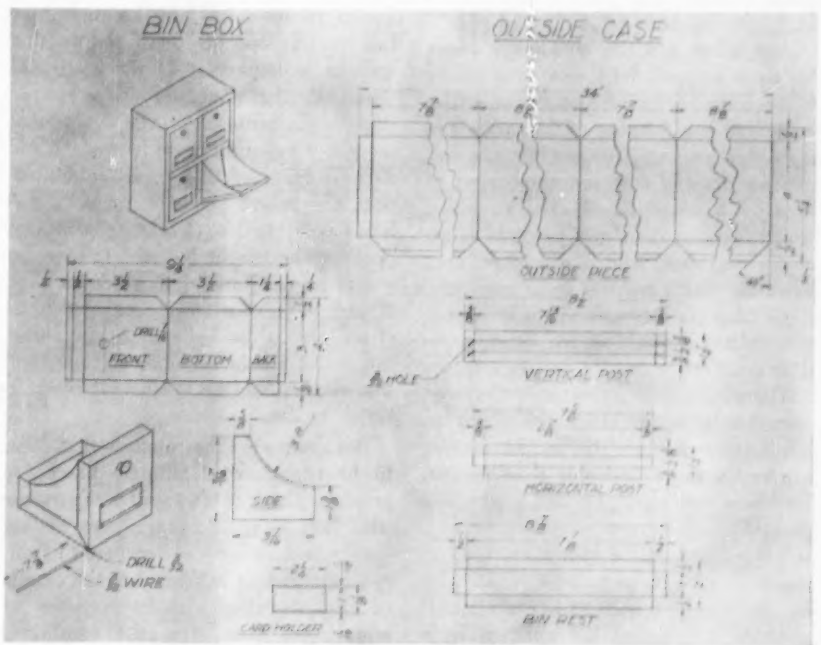
When assembling, fit the boxes in place and drill 1/8″ holes in the outside case and vertical post for the 3/32″ rod. Cut two 3/32″ rods 8″ long and point one end slightly. Insert through case, individual boxes, and vertical posts to form hinge. The rod should be soldered to the outside of the case and then hold box on edge and heat the soldered joint until a ball of solder is formed on the inside of the case to act as a stop. Cut off the excess rod on the outside of the case and file flush.

A back cover may be added to the case if desired.

The finished project is an attractive and useful assortment box that will prove handy in the home workshop. ★

Bill of Materials

No. of Part Pieces	*Material and Size*
4 Bin front, bottom, back, and top	28 ga. gal. iron, 4″ x 9¼″
8 Bin sides	28 ga. gal. iron, 3 7/16″ x 3 7/16″
1 Outside case	28 ga. gal. iron, 5¼″ x 34″
1 Horiz. post	24 ga. gal. iron, ⅞″ x 7⅝″
1 Vertical post	24 ga. gal. iron, 1¼″ x 8⅝″
4 Card holders	28 ga. gal. iron, 1⅛″ x 2¼″
4 Tinners rivets	6 #
2 Hinge rods	3/32″ welding or brazing rod
2 Bin rests	28 ga. gal. iron, 2″ x 8⅞″



Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

The Griper

ONE of the many privileges enjoyed by the modern teacher in this Great Land of Liberty is that he has unlimited opportunities to gripe. This he does with great enthusiasm whenever the occasion seems to warrant it. However, the real value of this blessing can be discounted frequently, because only on rare occasions does a particular gripe reach the administrators by means of the grapevine.

The lack of reaction on the part of the learned gentlemen who are responsible for making the rules may be accounted for by the fact that teachers tend to gripe at times when they are quite sure that those who might do something about the cause of their annoyance are elsewhere.

They will attend a meeting called by some educational potentate, and they will nod their heads in silent approval of the profound pronouncements that emanate from the mouth of the Great I Am. But, just as soon as they are free from confinement, they will whisper to their associates, "What does that old So-and-So think we are, making us spend our 'free time' listening to all that tripe? He ought to know that school closes at four o'clock, and now it's six. How does he get that way? We are not paid for working overtime." And so forth, until the post-session on the sidewalk terminates.

And what are the customary bases for these gripes? Why, everyone knows that teachers are grossly underpaid. The custodian is a member of the union and is paid as much as the teacher who has exposed himself to the dreary grind of securing a college degree. The machinist who lives next door gets twice as much as his neighbor, who is a teacher, and, what do you know, he owns two cars, while the poor teacher is still paying five dollars a week on his single antediluvian Ford.

The disgruntled fellow fails to recognize that he has rich rewards which, in the minds of some befuddled people, are vastly more desirable than money. He has a nice clean job and works in a pleasant environment. He has an easy job, too, in that he is not required to exercise his larger muscles. Moreover, he has both social and professional prestige because of his position as a public servant. And he should not forget that he works only six hours a day and does not have to report on Saturday. Most important of all, he has opportunities to guide young people into, and to prepare them for, good citizenship.

Are not all of these perquisites more desirable than cash? Who said they are? One might say that the answer to this question is "yes," were it not for the fact that friend teacher is compelled to live in a community where the necessities of life have to be bought and paid for. As a matter of fact, all the unfortunate soul would like to have is a salary schedule that school authorities have kept in line with the expanding financial pace prevailing in a modern industrial world.

Another cause for griping appears when we think of the fallacy that the working hours of a teacher are short. Apparently the griper bewails the fact that the duties for which he is responsible are not confined to teaching. These additional duties demand his attention during his so-called free time. He has to attend the teachers' meetings, called by someone who has a mortgage on the teachers' time. Parent-teacher meetings are a *must* in a teacher's life, so absence is considered to be a delinquency. He must coach basketball or sponsor certain club activities, to say little about preparing his lessons and correcting and grading countless piles of papers. All of these, and others, take time from the leisure which he is supposed to have, but does not.

Another gripe we hear frequently is that the teachers of English and mathematics do not teach what they are expected to teach. It appears that they fail to impress on their pupils that spelling is important in the affairs of the public, that double negatives are not popular in informed groups, or that there is a vast difference between 2 and .002. Because of this regrettable situation, the griper bemoans the fact that he is compelled to teach what is supposed to be taught by others. In other words he has formed the opinion that, if the other teachers would teach as effectively as he believes he is doing, the school would be more efficient, and the world would be a pleasant place in which to live.

But there are other matters that seem to be considered legitimate bases for griping. There is always the supervisor who fails to react promptly to the requests sent in by the teacher, or who is so meticulous in regard to the details of administration that he becomes an annoyance. Then, too, the conditions in the school are "impossible." It is too hot or it is too cold. The shop is dark or the glare of the sun disturbs the pupils. The equipment is obsolescent or it is in need of repairs. The classes are too large, or they are composed of the discards from other departments.

And so it goes, on and on and on. There is no limit to the ingenuity displayed by the griper in thinking up conditions to gripe about. The poor fellow is beset by his many afflictions—there is no hope for him. If one problem is adjusted, there will always be another. Which causes us to wonder, "Who wants to be a teacher anyway?" However, griping is a popular sport that hurts no one. Perhaps it's a valuable outlet for the emotions of the guy who is trying to convince himself that everything in the universe is wrong.

As a remedy to the situations described above, may we suggest that the teacher seek the aid of the ever-helpful custodian as a spokesman. This gentleman fears no one, he is usually fairly well entrenched in his position, and he has the ear of the high munky-munk. With this background, he is excellently equipped to impress those in authority that injustice is being done to a faithful, but mute, public servant. ★

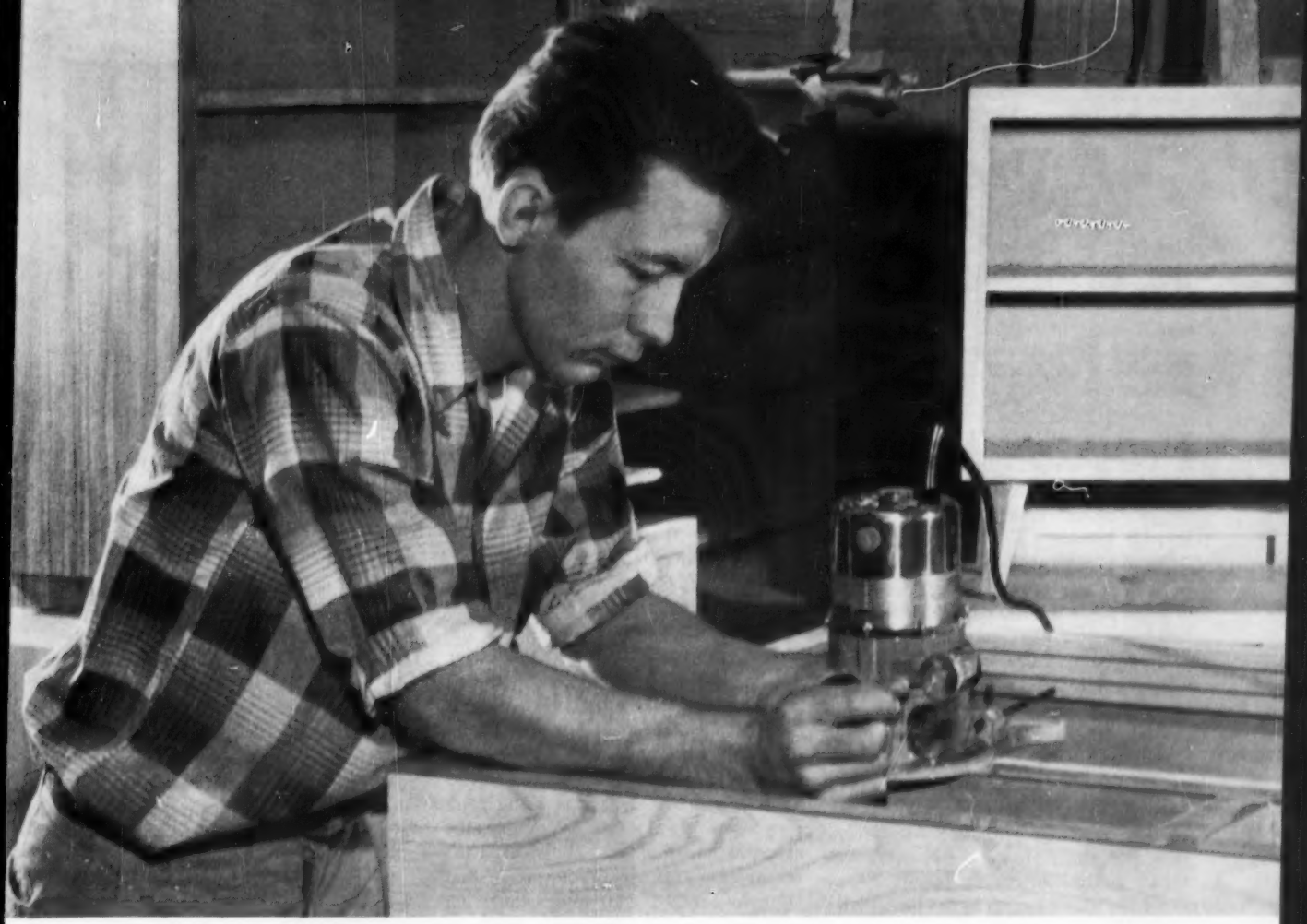
Students Plan . . . *from page* 17

vided above the office and tool crib in an effort to make maximum use of the ground floor space for laboratory purposes. A space-saving circular stairway gives access to the classroom.

Some area tool panels, containing special tools peculiar to certain operations, have been located throughout the shop. It is planned that the keys to these individual panels will be checked out from the central tool room.

Separate car stalls are 8′ wide and approximately 28′ long. A paved, enclosed parking area has been provided at one end of the building.

Neither of the shop plans presented here are suggested as panaceas for the various illnesses prevalent in many shop layouts. However, they do represent thinking and a great deal of work on the part of the students. Along with the origination of the plans themselves went the selection of all pieces of power equipment and every hand tool necessary for use in the various instructional areas. Furthermore, additional drawings were made showing such important items as design of grease traps for the automotive shop and construction of tool panels for use in the composite general shop. ★



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"Our most recent purchase is the SKIL Model 297 Router shown in the photo above. After a first trial, we immediately purchased 3 more and now run them at top production speed turning out 750 formica dinette tops a week. This is the best ¾ H.P. Router tried in our shop.

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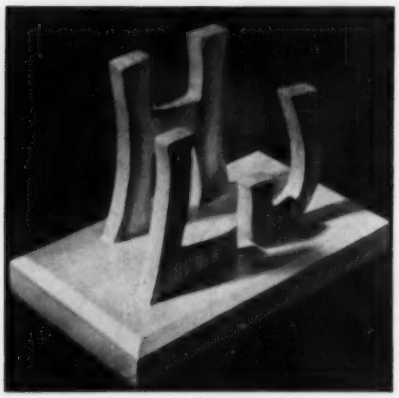
A student shows what he can do

A Useful Letter Holder



[EDITOR'S NOTE: This article was written by a 13-year-old, eighth-grade student who writes that he "enjoyed making this letter holder and thought perhaps others might like to make one." It was forwarded to us by Chris H. Groneman, Head, Department of Industrial Education, Texas A & M College, as an example of what young America can do.]

By Lyman Hardeman

Student, Consolidated Junior-High School, College Station, Texas

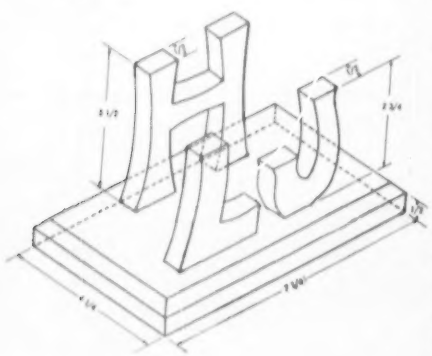
IF you do not have a letter holder, or want to make another one, perhaps this design will please you. When it is finished it will look good on any desk in your home.

Almost any hardwood can be used to make the letter holder. The tools necessary are a rule, coping or jigsaw, band saw, screw driver, and sandpaper.

To make the base, cut a piece of hardwood slightly larger than 7¼" x 4¼" and plane a surface until it is clean and smooth. Smooth one edge square with the planed surface, then chamfer one corner for planing the end grain. Plane the end toward the chamfered corner until it is square with the planed surface and edge. Measure and mark the board and cut to correct length, allowing 1/16" for planing to the line. Plane the final surface to desired smoothness and then cut a ¼" chamfer around the top edges.

Select the style of letters you wish and lay them out on hardwood, ½" thick. The grain should run vertically. Cut out the letters with a coping saw, or jigsaw, and file the letters smooth with a half-round file. Then sand all parts until smooth. Fasten the letters to the base with glue and #6 flat-head wood screws, 1½" long. When fastening letters with a rounded base, such as *J*'s or *O*'s, you should flatten a small place for sturdiness in mounting.

Apply two coats of white shellac and rub with fine steel wool. Glue green felt to the base. ★



Divergent Views . *from page* 14

theory, that if pupils cannot master academic subject matter reasonably well they should be sent to the shops, is certainly being dispelled by a nuclear age suddenly thrust upon us. If the learner is to reach the top of the ladder in any craft, he must master the theory peculiar to that occupation whether it be electricity, sheetmetal work, plumbing, carpentry, automotive work, or machine shop. Theory in many of these areas is exceedingly abstract and complex. Not only must he master the essential manipulative skills and the necessary fundamental knowledge that is to be applied with these skills, but he must remain constantly ready to master the new skills with new equipment and new methods which the present industrial revolution is forcing on the worker.

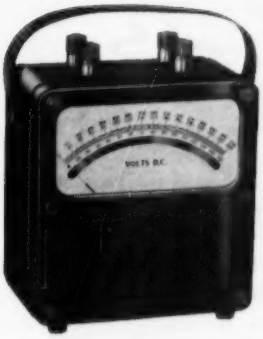
It is not for us to make academic thinkers out of some people and so-called practical workers out of others. You cannot isolate one from the other and still have intelligent, capable people. Reading a book, be it ever so authentic in a craft area, does not make a craftsman. A real craftsman is an intelligent man who has the proper attitudes toward work, pride in his vocation, and who can apply theoretical fundamentals of his vocation, coupled with his skill as a worker, to the solution of problems in his craft.

The genuine *desire to learn* can be of more value to the learner than much of what he has already learned. This is particularly true in the realm of industry. Employers place a high premium on a prospective employe's willingness and ability to learn on the job.

There are certain other essentials which should never be minimized. Character can be everything. A dishonest, unreliable person is a liability to himself, his family, community, and his employers. He must learn to get along with others. More people lose their jobs on this account than any other. The will to do is never to be discounted. Living according to good rules of mental and physical health brings a man to his job each day. Sound citizenship qualities are never to be taken lightly whether a man is a worker in a plant, a member of a labor union, a management man, and in the final analysis a citizen of his community, state, nation, and of the world. Without good citizenship we ultimately lose the situation in which we can make a living for ourselves and our loved ones as free men.

Upon closer scrutiny, there seems to be considerable disparity between the White House Conference objectives and the findings of the Gilbert Youth Research Co. Possibly this, too, is a sign of the times. Adults want their kind of values for youth, while youth analyzes the educational picture in terms that are not always in agreement with their elders.

Certain implications assume new proportions in industrial education as we enter the new industrial revolution. Industrial arts, always a vital part of general eduction, must not only acquaint youth with the processes, machines, and materials employed in producing the products of industry, but it is through industrial arts that the learner must gain reasonable skills in the use of common machines and hand tools for his own general satisfaction. Preparing tradesmen not only means they must be skilled artisans, but that they must possess maximum balance between general education and essential trade skills. We need educated tradesmen wherever we can produce them. Both programs, industrial-arts education as well as vocational-industrial education, must do their share in producing good citizens, all of which means a common-sense attitude toward general education and specialization. ★



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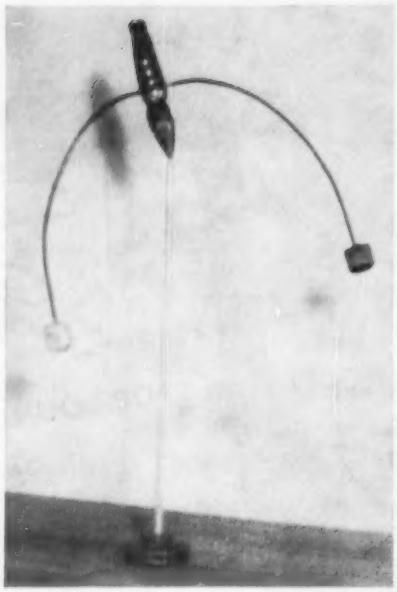


Younger students will like

Jo-Jo the Clown

By James T. Campanella

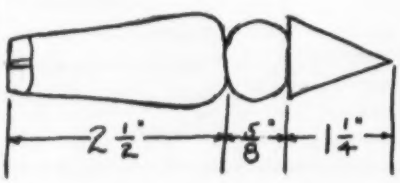
Public School 33, Rochester, N.Y.

JO-JO, the balancing clown, makes a fascinating whittling project, particularly for sixth- and seventh-graders. He will balance on the end of a pencil or the edge of a table, swaying back and forth until he comes to rest in a vertical but upside-down position.

A piece of 3/4" x 3/4" x 8" white pine out of the scrap box is enough to make the body and the 5/8" blocks for balancing at the end of his arms. An old coat hanger cut to an 18" length can be bent for his arms. The wire goes through a hole in Jo-Jo's body 2 3/8" from the tip of his hat.

After whittling out the body from the layout, the wood should be sanded and may be painted or colored to suit the student's taste. A piece of wood dowel rod set in a base may be used for a support.

The simplicity of construction and the small amount of time required make it an excellent elementary woodworking or end-of-the-semester project. ★



JIGSAW JONES

*strictly personal

A new faculty member at Marshall College, Huntington, W.Va., is RONALD B. THOMAS. He will be working out of the state T&I education department as consultant, industrial-training project.

MARCUS MCWATERS has been named head of the industrial-arts department at Southeastern Louisiana College, Hammond.

B. J. DENNIS of Oakland, Calif., has been named to the part-time post of woodwork consultant in the occupational therapy curriculum at Mills College.

WILLIAM R. WOODFIN has been appointed state supervisor of T&I and industrial arts in Arizona. He'll be headquartered at Phoenix.

MILFORD M. HAMLIN, formerly assistant manager and central states representative of the Department of Education, American Type Founders, has joined the sales staff of Graphic Arts Equipment Co., Chicago.

CLEO F. SHOOK and CHARLES A. STEBBINS have recently been named to the faculty of New York State Teachers College, Oswego.

FRANCIS L. MCLEAVEY, former director of Fond du Lac, Wis., Vocational and Adult School, died in Madison following a brief illness.

WILBUR TURNEY has been named district departmental chairman of industrial education for the Kern County, Calif., Union High School District. CHARLES H. AMBELLAN was appointed district coordinator of industrial arts education for the Compton Union, Calif., High School District. ★

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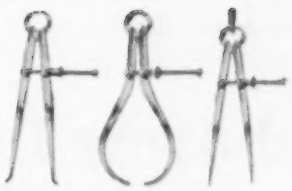

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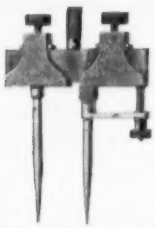

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New Bulletin 1203, "How to Read, Use Care for Micrometers and Vernier Gages." Also, "Training Aids Bulletin No. 1202" which shows many Starrett training aids available free or at small cost.

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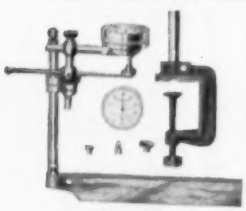

Ideal for teaching setup and inspection methods. Easy to set up, read and use, standard attachments provide for universal use on machine tool posts, arbors, face plates, surface gage spindle, etc. Graduated .001", reads 0–10, range 0–.002".

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To show your visual aids better make and use this

Fold-Away Display Unit

By Samuel Garry

James M. Kieran Junior-High School, Bronx, New York

INDUSTRIAL publications are by far the most prolific of the many sources at our disposal to provide industrial-arts students with a knowledge of industry. The fold-away display unit shown here was made and designed for the most effective use of these publications.

There is hardly a company or industry that does not provide volumes of brochures, pamphlets, photographs, bulletins, and beautifully printed advertisements of their processes and products. The industrial-arts teacher need but request them.

In addition to industrial sources, I have discovered other fertile fields for additional materials for the display boards. Students enjoy making displays of industrial processes or flow charts. The students' parents will solicit their respective employers for a good deal of material you can use. Newspapers and professional magazines also will provide interesting, timely articles and pictures that can be effectively displayed. I can not leave a Printing Teachers' Guild meeting without an armful of items that I use to refresh some old displays.

At the present time my fold-away display unit provides for the following: It is a permanent display in the shop of related information. It is a means of displaying numerous student-made charts and reports. It provides a large display area that can be folded and slid into a corner. It provides a storage space for displays until they are needed. It permits close and detailed examination of the displays by the students without endangering the display. It permits me to have convenient reference materials at my pointer's tip during shop talks. It permits periodic changes to keep us up with the newer concepts and developments in industry. And it serves as a stimulant to students to do original research so that they may display their work in the display unit.

The fold-away display unit is constructed by building the four parts of the unit simultaneously. Sixteen pieces are needed for the bases and 12 pieces for the tops. (See Bill of Materials.) With the table saw set for a 3/8" depth, rip grooves for the individual display boards at 1/4" intervals (Diagram 2). Allow 3/16" for front facing edge. The remaining 11/16" will provide ample space for wood screws when joining the tops to the bases.

Butt the bases with nails and glue. Masonite facing will reinforce it sufficiently for the amount of handling the unit will receive. Butt the tops so that

Bill of Materials

Bases:
- 8 pieces pine, 3/4" x 4" x 20"
- 8 pieces pine, 3/4" x 4" x 23½"
- 4 pieces Masonite, 3/16" x 20" x 25"

Tops:
- 4 pieces pine, 3/4" x 4" x 20"
- 8 pieces pine, 3/4" x 4" x 24½"
- 4 pieces Masonite, 3/16" x 20" x 25"

6 butt hinges, 2½" center
16 ball casters, 1" diameter

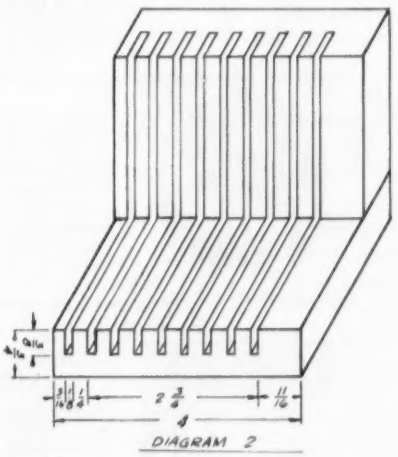


DIAGRAM 2

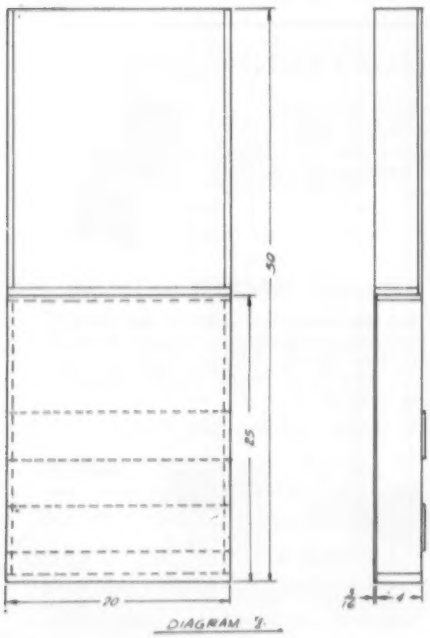


DIAGRAM 1

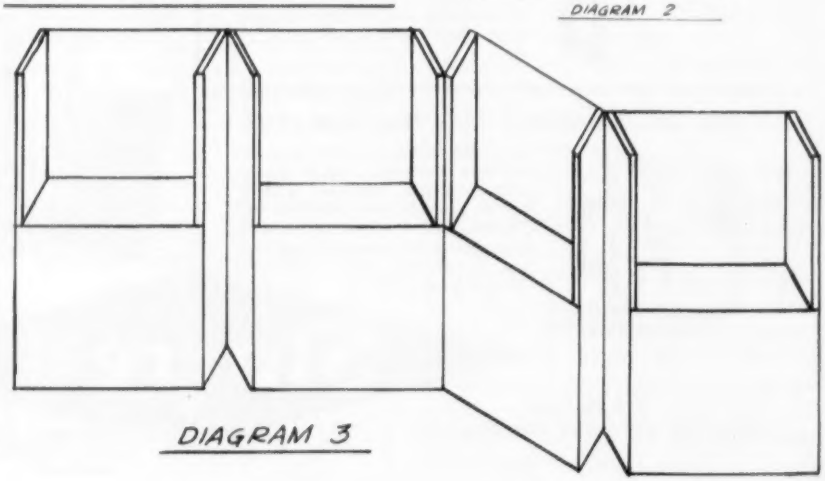
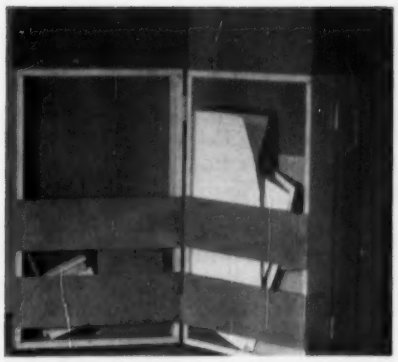


DIAGRAM 3



The bases of the display unit can be for storage.

the saw cuts align, and back with a sheet of Masonite (Diagram 1). Attach the tops with flat-head screws and glue so that the screws will lead into the 11/16" section of the tops. Align the front edge of the tops with the Masonite of the bases.

Two butt hinges are used between each part of the unit so that it will fold together. Hinging in this manner will permit one part of the unit to show even when it is completely closed. Four ball casters under the base of each part will allow easy rolling when opening, closing, or moving the unit from place to place in the shop.

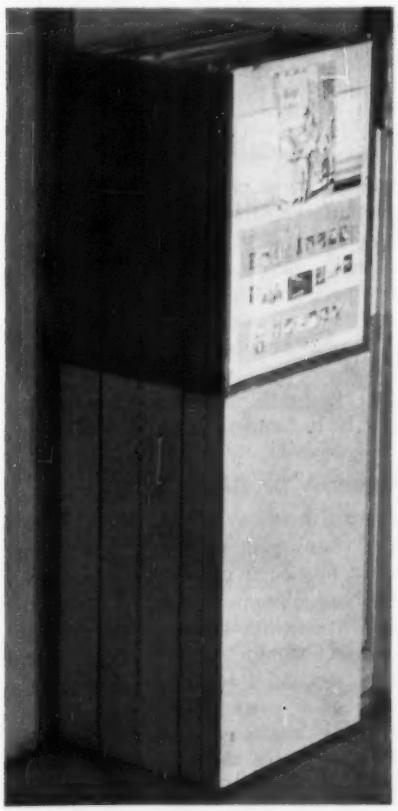
I use eight individual displays for each part of the unit. They are made by mounting different colored construction paper on both sides of .040 chip board. The material to be displayed is pasted on the construction board. The board is then slipped into an envelope made of .010 clear, transparent vinylite. The envelope fits into the grooves of the tops. This means I have 64 individual displays.

Each envelope has an identification tab. When I want one of the rear boards, I slip it out of its slot and place it in the first slot. Taped edges of the envelopes make changing quick and easy. The vinylite covering over the materials eliminates the danger of the materials being torn when the displays are changed or while being inspected by the students.

The bases of this unit are used for storage. With two wide Masonite strips attached across the back edges, the bases make an excellent storage space for bulky items such as printing plates, stereotype mats, mold, deckles, etc., that cannot be attached to the individual boards. ★

Opening the unit is easy for the smallest pupil.

When closed, the display unit fits into a corner.



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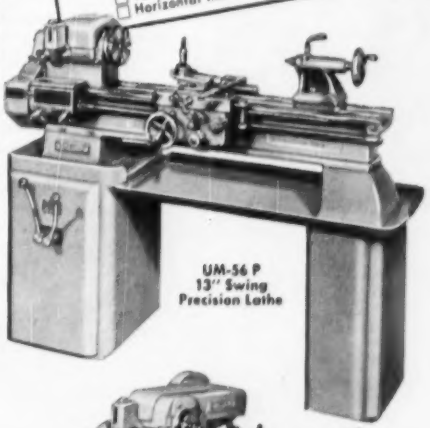

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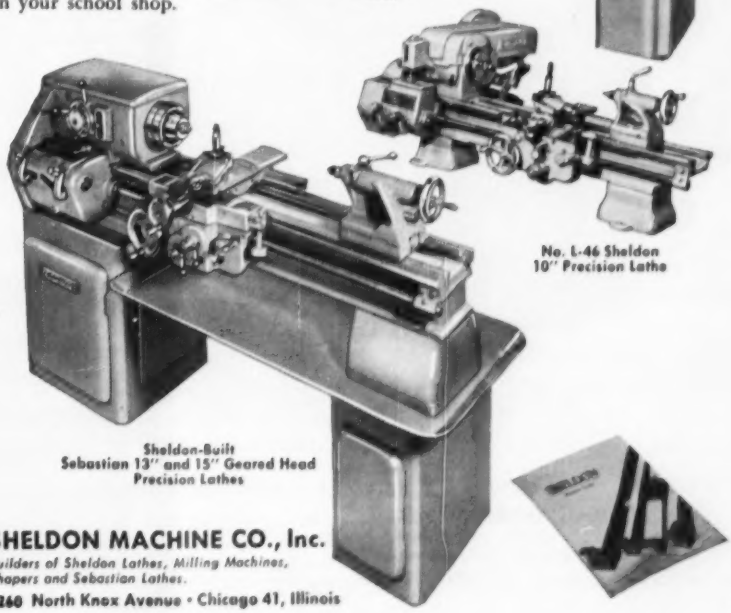

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happenings in industrial education

Oregon Vocational Meeting

A STATE-WIDE summer conference for teachers and workers in all the vocational-education services in Oregon will be held June 10-13 in Newport.

O. I. Paulson, state director of vocational education, is in charge of planning arrangements. Included among the speakers will be M. D. Mobley, executive-secretary of the American Vocational Association.

The last all-service conference held in Oregon was in 1952. Annually vocational-education conferences are usually held by the separate vocational services.

Save Money on Films

THE California Vocational Foundation, an endowed nonprofit corporation, has announced a plan whereby two-thirds the cost of certain instructional films may be refunded to purchasers.

"We are greatly interested in promoting the use of films, filmstrips, and slides of the vocational how-to-do-it type," states Leon Benwell, president of the foundation. To promote this activity, the foundation has established a fund to pay two-thirds the cost of such visual aids.

Listed as examples of approved films are "Putting a Job on the Platen Press" and several dealing with carpentry and machine-shop skills. For more information write to California Vocational Foundation, P.O. Box 8033, Long Beach, California.

Receives Illinois Award

LOUIS V. NEWKIRK, director of the division of industrial arts, Chicago Public Schools, has been named the 1957 outstanding leader in industrial education in Illinois. The award, an annual presentation of the Illinois Vocational Association, was made at the association's recent annual convention in Chicago.

Walter A. Kelhm, head of the department of industrial education, Eastern Illinois State College, Charleston, and immediate past president of the association, made the presentation.

Graphic-Arts Scholarships

EIGHT graphic-arts teacher scholarships for study at Rochester Institute of Technology, New York, will be awarded this summer by the National Scholarship Trust Fund of the Education Council of the Graphic Arts Industry, in cooperation with the International Graphic Arts Education Association.

Each scholarship is valued at $300. Winners of scholarship awards will also be invited to attend the 32nd annual Conference on Printing Education of the International Graphic Arts Education Association, to be held at the Rochester Institute of Technology, July 28-Aug. 3.

Missouri Officers

EMIL H. ROHLFS has been elected president of the Missouri Industrial-Education Association for the current year.

Other officers are Robert E. Goetz, vice-president, and Maurice L. Stewart, secretary-treasurer.

Gordon O. Johnson is president of the Missouri Vocational Association this year. Lester B. Swaney is vice-president, and H. H. London is secretary-treasurer.

Growth in Illinois

AMONG the many new industrial-education shops built this year are the new shops now being used at Champaign and Mattoon, Illinois. Previously the shops in the two cities were scattered throughout the communities. Now in both cases they are under one roof.

In other parts of Illinois, industrial-arts also shows growth. Schools which have indicated they will inaugurate a program next fall include: Alexis, Ash-

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ton, Dallas City, Lena, Palmyra, Peoria Heights, Tallula, Waterloo, and Yorkville.

Spring Convention

THE West Virginia Industrial-Arts Association held its spring convention at Jackson's Mill, April 26-27. Among the principal speakers were R. Virgil Rohrbough, state superintendent of free schools; and Stanley H. Martin, president, and James C. Bay, professor of education, Wesleyan College, Macon, Ga.

The association will hold its fall meeting at the West Virginia Institute of Technology, Montgomery, October 4-5.

Aviation in Alaska

THE fifth annual Western Alaska Teachers Conference, held in March in Anchorage, was dedicated to the purpose of interesting teachers and administrators in aviation education. Sponsored by the Alaskan Education Association and the Civil Air Patrol, the conference featured talks by Roland H. Spaulding, professor of vocational education, New York University.

Machine-Shop Teachers

CHARLES MARTINETZ of Samuel Gompers Vocational and Technical High School was recently elected president of the Machine-Shop Teachers Association of New York City.

Other officers elected were: Morris Schapiro of Williamsburg Vocational High School, Brooklyn, vice-president; Ray Greenberg of Brooklyn High School of Automotive Trades, treasurer; and James Anderson of Queens Vocational High School, Long Island City, secretary.

The association is working on a new series of job project sheets.

Convention Calendar

Georgia Vocational Association, Biltmore Hotel, Atlanta, June 13-14.
Pelican State Vocational Association, Southern University, Baton Rouge, La., July 9-13.
International Graphic-Arts Education Association, Rochester Institute of Technology, N.Y., July 28-Aug. 2.
American Vocational Association, Philadelphia, Pa., Aug. 5-9.
Arkansas Vocational-Education Association, Marion Hotel, Little Rock, Aug. 19-22.
West Virginia Industrial-Arts Association, West Virginia Institute of Technology, Montgomery, Oct. 4-5.
New England Industrial-Arts Association, Burlington, Vt., Nov. 1-2.
North Carolina Industrial-Arts Association, Lenoir, Nov. 2.

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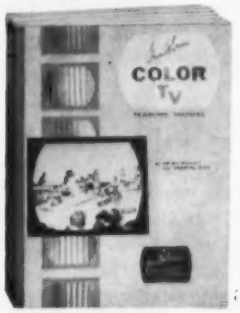

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Plywood cabinet doors, after fitting and hanging, should be left in an open position for a week or two, enabling both sides to receive *identical* room air drying, which prevents warping and twisting.—*Stan Schirmacher, Cottonwood, Ariz., High School.*

Wheels from Reels

Here's a practical use for those 50′, 8mm plastic film reels which are discarded after rewinding film onto 200′ reels. They make attractive wheels for toy wagons, carts, and pull toys, and add a professional touch to student projects. —*Joseph F. Ruffina, Benjamin Franklin High School, Rochester, N.Y.*

Safety on the Jointer

I painted a wide red line on the top of my jointer fence. When a student wishes to face or edge a piece of wood, he places it on top of the line. If he can see the line sticking beyond the wood he knows that the piece is too short and should not be used on the jointer.—*Wesley L. Adams, Laconia, N.H., High School.*

Use a Squeegee

An ordinary window-washing squeegee does a far better job of removing coolant, abrasive dust, and other debris from the magnetic chuck on the surface grinder than rags or paper, and there is less litter to be gathered up at the end of the period.—*Henry Joseph, Gardenville, Pa.*

For That Tiny Screw

Next time you're faced with the problem of getting at a little screw—a screw tiny enough for a jeweler's screwdriver—and you haven't a tool small enough for the job, a satisfactory substitute can be whipped up in a hurry by grinding a piece of old hacksaw blade to fit the screw slot.—*Howard R. Schramm, Maple Heights, Ohio, High School.*

Slip-Cover the Press

Junior-high-school boys often forget to use a padding block to avoid hitting the table when they drill in the press. We made a wooden cover which slips over the present table and into which we can place padding boards. When the boards are badly riddled, we replace them.—*Don Kinnaman, Glendale, Ariz., Junior High School.*

Use for Broken Rule

After I accidentally broke my 72″ steel tape rule, I tacked a 36″ length of it across the back of my workbench. Now I can measure work quickly by holding it up against the tape.—*Roger M. Woodbury, Wellesley Junior High School, Wellesley, Mass.*

Chip Tricks

Small chips that cling in holes drilled in any magnetic material can be removed by a magnetic probe. Hold a piece of iron wire—or a small drill bit—against the side of a magnet and carefully draw out the chips. Don't place the

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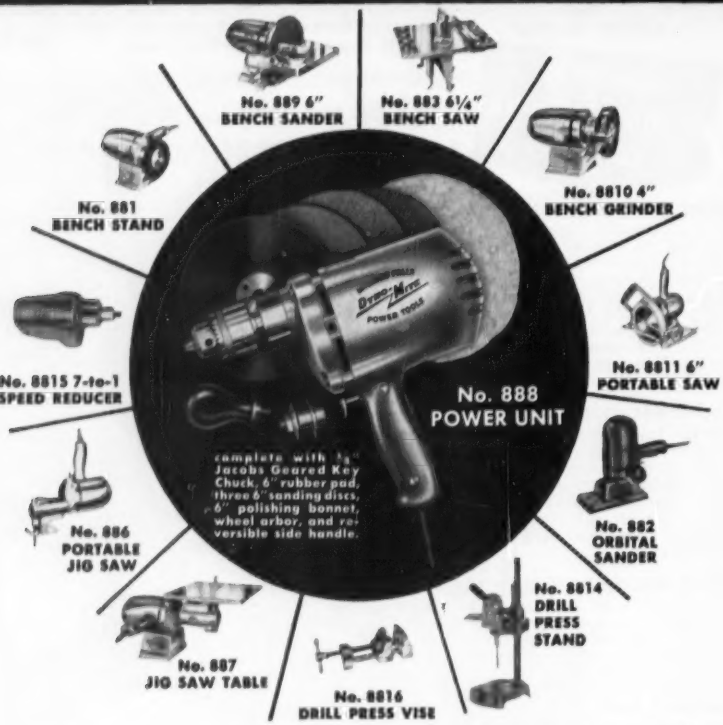
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wire across both ends of the magnet as the pull will not be as great.—*Hugh Lineback, Oklahoma A & M College, Stillwater.*

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The round plastic costume jewelry beads known as "pop" beads make excellent feet for small wrought-iron projects. The small projection on each bead may be clipped off and the hole is easily reamed to fit $\frac{3}{16}$" or $\frac{1}{4}$" rod. The beads are inexpensive and come in a variety of colors as well as black.—*Thomas C. Hughes, Glen Cove, N.Y., Junior High School.*

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Since we do not have facilities for steaming water skis for forming, we have found that soaking the front 18" of the skis in water for 72 hours allows them to bend easier without cracking. A small oil drum is an excellent container for the soaking process.—*William F. Yoico, Washington Ave. Junior High School, Savannah, Ga.*

To Prevent Splintering

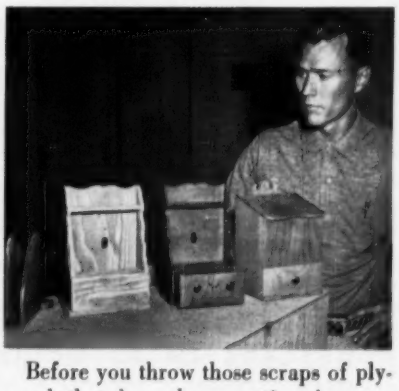
To prevent students splintering the bottom sides of plywood when sawing it, have them stick a strip of cellophane tape along the bottom where the cut is to be made. After sawing, the tape can be stripped off, leaving a clean cut.—*Harvey Muller, Danboro, Pa.*

Doors for Practice

A local contractor has provided doors from the salvage pile for our shop students to practice mortises for lock sets, mounting locks, and checking them for proper operation with the knobs and keys functioning. In addition, each shop student is required to recess a tubular lock set and a pair of butt hinges.

The number of holes on the stile (above) indicates the rate at which doors are used. By planing the gains down, the door can be used again and again.—*Ernest J. Leal, Draper High School, Schenectady, N.Y.*

Scraps to Projects



Before you throw those scraps of plywood that have been getting in your way into the junk box, consider a few of these nifty items that have been made from just leftover pieces. A set of napkin holders (from left, above) with "feet" on each to make them more stable, light switch boxes in an early American pattern with small drawers for knick-knacks, and a recipe box for filing 3" x 5" recipe cards in the top part and the bottom drawer for select cards for immediate use.—*G. W. "Duke" Young, North Hollywood High School, Calif.*

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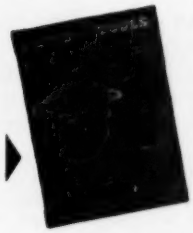

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Books:

TV Tube Location and Trouble Guide. New York: John F. Rider Publisher, 1956. Pp. ix+46. $1.25.

Since much of the servicing of TV equipment must be done in the home it is important that the serviceman be in possession of the information he will need to diagnose difficulties and correct them quickly. This book is intended to provide him with this information. Tube lists are included to assist him in identifying various types, and to recognize their function.

Servicemen will find the explanations and diagrams included to be of considerable value in expediting their work.

The Presentation of Technical Information. Kapp. New York: The Macmillan Co., 1957. Pp. 147. $1.95.

A weakness, which is altogether too common among teachers in the field of industrial education, lies in their inability to write on technical matters in a manner that will arouse the interest of their readers. This book is designed to be used as an aid for anyone who has a desire to write on technical subjects.

Among others, it contains chapters on making what you write easy to understand, easy to remember, meaning what you say, generalization, using the right word, and qualification of words.

While the book is intended for use by people in the technical world, it will be valuable to any person who has a desire to write in any field.

Reginald O. Kapp is dean of engineering at the University of London, England.

Hi-Fi Handbook. Boyce. Indianapolis: Howard W. Sams & Co., 1956. Pp. 224. $3.00.

This handbook provides comprehensive information for those interested in hi-fi reproduction. It covers applied theory, equipment selection, and system arrangement.

There are six chapters in the book, each one dealing with a particular phase of the field. Among these are loud speakers, amplifiers, controls, design, and installation.

Technicians, as well as amateurs, will find it helpful in dealing with the problems that arise in working with hi-fi equipment.

William F. Boyce is well known as an authority in the field of electronics.

Building Trades Blueprint Reading. Part 1. (Third Edition). Dalzell, Battenberg, Paul, and Woltjes. Chicago: American Technical Society, 1956. Pp. 128. $2.75.

This edition is a revision of a book which has been used quite widely all over the country. The terminology and the illustrations have been brought into harmony with modern practice, and a series of nine competency tests have been added as an aid in checking the progress of the students.

Whether or not the teacher has a copy of the original edition, he will find it worthwhile to obtain this book.

J. Ralph Dalzell is a building and construction specialist. Rex Battenberg and W. Rahy Paul are members of the staff of American Technical Society. William Woltjes is coordinator of building trades, Los Angeles Public Schools.

Hand Woodworking. (Fourth Edition). Hunt and Tate. Pp. xx+418. $3.00.

Machine Woodworking. (Revised Edition). Hunt and Cermak. Pp. xiv+289. $2.96. Oklahoma City: Harlow Publishing Corp. 1956.

The first of these books is a revision of one which was published originally in 1925, and is intended as a guide in the various phases of basic woodwork. It is suitable for a text for beginning classes.

The second, in the field of machine woodworking, is also a revision of an earlier publication which has been used extensively. This new edition has been brought up to date, and obsolete material has been omitted.

DeWitt Hunt was formerly head of industrial-arts education at Oklahoma A & M College, Stillwater.

John Bruce Tate is an assistant professor in the same institution.

John L. Cermak is head of the industrial-arts department at Southwestern State College, Weatherford, Okla.

Nursing Arts Practice. Columbus: College of Education, Ohio State University, 1956. Pp. v+183. $1.62.

This manual consists of a series of instruction sheets which are based on the practices followed in a number of Cleveland hospitals. These sheets provide for each service rendered by the aide, a statement of the service, its purpose, the equipment needed, the specific procedure to be followed, and lists of important points to be remembered while rendering the service.

The book should serve as a guide in the rapidly increasing number of programs being organized for the training of nurses aides.

Alternating Current Fundamentals. (Second Edition). DeFrance. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1957. Pp. ix+262. $4.50.

This text is based on the experience gained by the author in teaching courses in this field at the U.S. Coast Guard Training Station at Groton, Conn., and at the New York City Community College.

In the preparation of the book the author assumed that the reader has a good foundation in direct-current principles, including inductance and capacitance. It was assumed also that he is familiar with algebra, and has a

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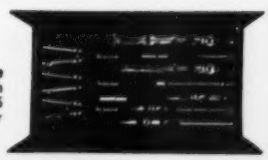

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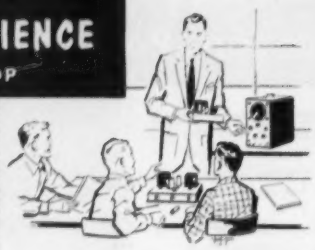

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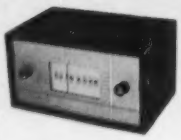

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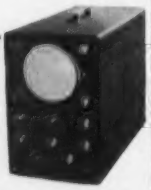

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basic knowledge of elementary trigonometric functions.

This second edition has had several chapters added, which contain material suggested by teachers who have been using the first edition.

Joseph J. DeFrance is head of the department of electrical technology, New York City Community College.

Practical Woodworking Projects for Today. Clemons. Milwaukee: Bruce Publishing Co., 1957. Pp. 98. $2.50.

This book contains drawings and explanations of construction features for more than 30 projects, with photographs and details of construction. Included also is basic information on stains and finishes which can be used to achieve pleasing effects.

The items included range from the simple to more advanced projects in order to provide for individual differences in pupils. These were selected by the author in an effort to capture and hold the interest of the pupils. He felt that the beginning student finds difficulty in originating good ideas, so he hopes to plant ideas in their minds, while at the same time leaving them the opportunity to work out their own designs.

Frank M. Clemons is a shop teacher and assistant principal at Churchland High School, Portsmouth, Va.

Pamphlets:

12-Volt Electrical Equipment for 1957 Passenger Cars is a 25-page, illustrated booklet published by Delco-Remy dealing with the charging circuit, starting circuit, ignition circuit, and miscellaneous equipment. The pamphlet is available from Technical Editor, Service Department, Delco-Remy Division, General Motors Corp., Anderson, Indiana.

It's Up to You is Publication 29 of the National Society for the Prevention of Blindness. The seven-page pamphlet concerns itself with the perennial problem of taking precautionary measures to prevent the loss of sight due to accidents. The pamphlet is well illustrated. Available from the Society at 1790 Broadway, New York 19, N.Y.

Looking in on Ohio School Shops is a 64-page, thoroughly illustrated publication of the Ohio Industrial Arts Association, Inc., that tells how some of that state's school shops have handled their public relations, storage, teaching, and safety. To members of the OIAA the cost is $1.00; to others, $1.50. The booklet can be ordered from Dean Kittle, Cairo, Ohio.

Note: **The Linotype Operator,** published by the Bellman Publishing Co., Cambridge, Mass., is priced at $1.00.

Audio-Visuals:

Teaching and Training with Tape Recorders, Teaching and Training with Filmstrips and Slides, Teaching and Training with Motion Pictures (Optical Sound), and **Teaching and Training with Motion Pictures (Magnetic Sound)** are four new publications of Bell and Howell that are devoted to the effective use of audio-visual materials. They are designed for use by audio-visual directors, and teachers who have occasion to use this media for teaching. Copies of the booklets are available from the Educational Sales Department, Bell and Howell, 7100 McCormick Road, Chicago 45, Ill. A 10c cost is requested to cover handling.

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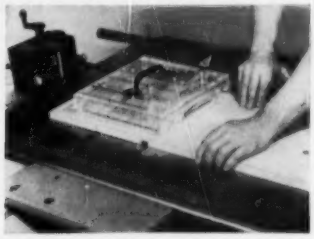

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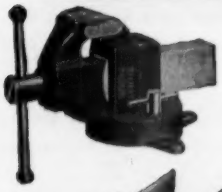

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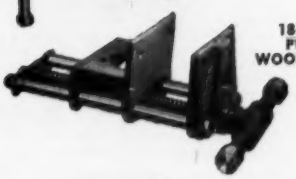

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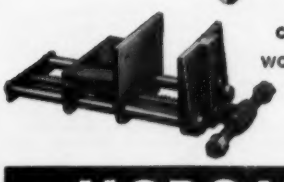

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American Industrial Arts Association Holds Convention in Kansas City

Nearly 1,000 teachers, supervisors, and students of industrial arts considered "Developments Affecting Industrial-Arts Education Programs" at the 19th annual convention of the American Industrial Arts Association, April 24-26 in Kansas City, Missouri.

Following a pattern established in previous conventions, small discussion groups were held following each general session on modern industrial-arts problems for additional exploration of the topic.

One of the highlights of the convention was an unusually vigorous business meeting. Cause for the interest was a suggested resolution which opposed Section 13 of the proposed Area Vocational School Bill in Congress. This section would assist states in setting up state industrial-arts supervisors with federal funds. After much discussion the resolution was tabled.

New president of the association is Kenneth Perry of the Colorado State College of Education, Greeley. Kermit Seefeld of Santa Barbara College, Calif., was named first vice-president, and Raymond Cherry of Lockport Township High School, Ill., was chosen vice-president for classroom teachers. Kenneth W. Brown of New York State College of Teachers, Buffalo, is secretary-treasurer.

John Fuzak of Michigan State University, East Lansing, was elected president of the American Council on Industrial Arts Teacher Education at its annual meeting preceding the A.I.A.A. meetings. Other officers elected were: Ray Karnes of the University of Illinois, vice-president; William Tierney of the University of Maryland, executive secretary; and Gus Wall of Stout State College, treasurer.

The American Council of Industrial Arts Supervisors named John Hurley, New York City, president. Morris J. Ruley, Tulsa, Okla., was elected vice-president. Merrill C. Hamburg, Detroit, Mich, was reelected secretary-treasurer.

On the final day of the convention, students in various teacher-training institutions conducted a series of demonstrations on industrial-arts activities.

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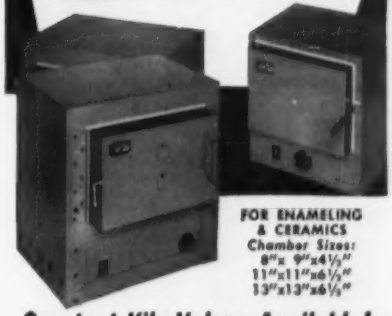

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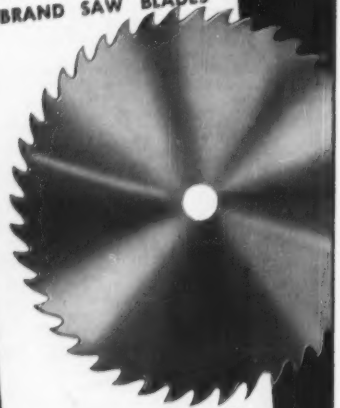

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news from Industry

(Circle the numbers on the card in this issue to secure the items listed.)

New Small Band Saw Announced by Tannewitz

A new small band saw has been announced by Tannewitz Works.

The new model, Type EV-24, is said to be an extra rugged machine designed to meet the demand for a small band saw with variable speeds of 300 to 6000 blade feet per minute. The saw can be adapted, the company states, to any kind of sawing, whether wood or metal, at either high or low speed. It can be adapted to saw from 60 to 1200 blade feet per minute, if desired.

The table, 24" x 28", is mounted on hinges and swings through any angle from 15° left to 45° right and may be locked in position by means of a hand clamp. Saws from ⅛" to 1¼" in size can be used.

For more information write The Tannewitz Works, Grand Rapids, Mich., mentioning SCHOOL SHOP; or *circle No. J1 on the business-reply card.*

New Features Added to C-Thru's Scales

The C-Thru Ruler Company has announced the improvements they have made on their 12" scales.

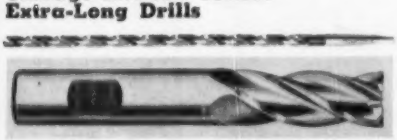
The firm first states that metal reinforcements have been added to add to their rigidity.

Other features listed by the firm are: all scales are exposed to full view for use at a moment's notice; slotted openings for convenient use eliminate squinting, searching, or turning to find the needed scale.

The firm manufactures two scales, one with 14 full-view exposed scales and the other with nine.

For more information write to the C-Thru Ruler Co., 827 Windsor St., Hartford, Conn., mentioning SCHOOL SHOP; or *circle No. J2 on the business-reply card.*

Chicago-Latrobe Makes Extra-Long Drills



Extra-long drills (top photo) introduced by Chicago-Latrobe are now available in lengths running up to a maximum of 18" in the size range. The extra-long drills are made of high-speed steel with straight shank and come in wire gage sizes #52 through #1 and fractional sizes 1/16" through ½", according to the firm.

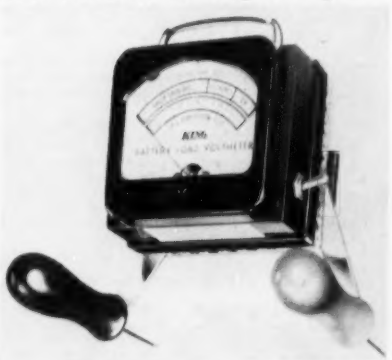
Taper shank-size range is 1/18" through 1½", the specifications state.

In addition, Chicago-Latrobe has added high-speed end mills to its line. The firm claims their end mills (lower photo) give more cutting mileage, economy, and accuracy because of the engineering in their design.

They say that sharp corners have been eliminated which adds to the tool's strength and that the flutes are so designed that chips move out freely.

For additional information write to the Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago 10, Ill., mentioning SCHOOL SHOP; or *circle no. J3 on the business-reply card.*

King Electric Announces New Portable Battery Analyzer



The battery analyzer recently introduced by the King Electric Equipment Company is reportedly equipped with testing prods that are adjustable for spanning the main posts of vehicle batteries regardless of spread or location.

Furthermore, the company states, the true battery condition is indicated on a 5½", brightly illuminated, expanded-scale meter that is calibrated to read "Good," "Recharge," "Check Each Cell."

In addition, the manufacturer also states that a secondary scale, expanded to provide approximately ½" between each 1/10 v, allows for individual cell analysis.

For additional information write to the King Electric Equipment Co., 9123 Inman Ave., Cleveland 5, Ohio, mentioning SCHOOL SHOP; or *circle no. J4 on the business-reply card.*

Cincinnati Tool Tells of Its New Deep Clamp

A forged-steel heat-treated, and large diameter full-length screw with a forged wing insures strength of the new deep clamp recently announced by the Cincinnati Tool Co.

The new clamp, the manufacturer states,

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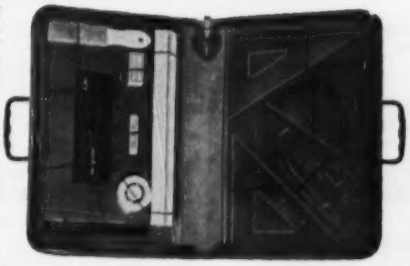

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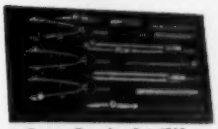

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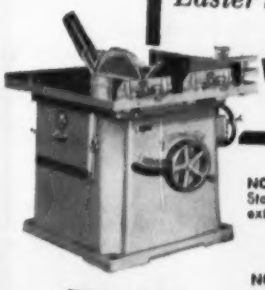

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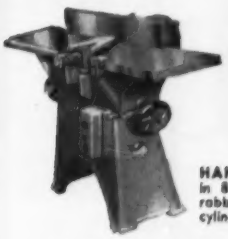

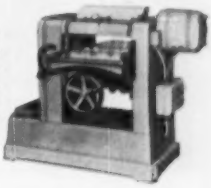

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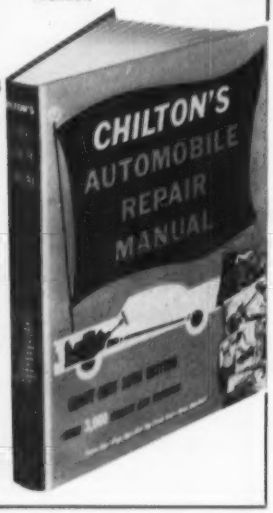

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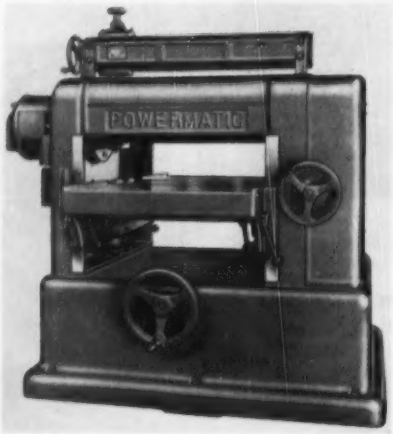
Powermatic Develops New Single-Surface Planer



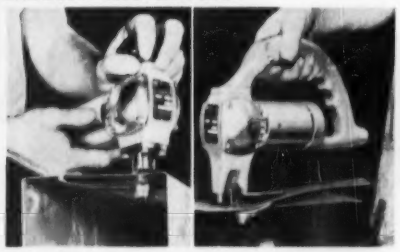
Powermatic Machine Company's Model 225-24, the culmination of experimentation and development, has resulted in a series of new features the firm has announced. They include: a quick-set table-roll adjustment that enables the operator to adjust the table roll from 0″ to .040″ with a small lever in front of the unit; a variable feed unit allowing for a complete range of feeds from 20 to 100 feet-per-minute.

In its description of the machine's design, the company says it has a massive base with a low center of gravity, keeping vibration at a minimum.

It is available with either a direct or a v-belt driver.

For more information write to the Powermatic Machine Co., McMinnville, Tenn., mentioning SCHOOL SHOP; or *circle no. J6 on the business-reply card.*

Black and Decker Adds Nibbler and Shears



The No. 16 Shear (above right) recently introduced by Black and Decker has a patented armature design for long, heavy-impact service, the manufacturer states.

The machine is designed with a one-piece shoe, contoured to indicate the correct cutting angles, and constructed to permit cutting a small radius, the specifications point out.

The firm adds that a deflector-plate prevents curling during the trimming operation. Also, the handle is designed to be gripped in many different positions for either guiding or pushing, with ample room to accommodate a large, gloved hand comfortably. Weight: 6¾ lbs.

The No. 16 Nibbler (above left), the firm states, punches out small, rectangular pieces without bending or curling the material. Operated on a punch-and-die principle, the tool delivers approximately 3300 high-intensity strokes per minute. The cutting die is made of high-speed nitrided steel and the punch is reversible. A punch-and-shoe design enables the operator to follow a pattern line on either side of the material being cut, and an adjustable stripper plate accommodates different material thicknesses the firm states.

For more information write to the Black and Decker Mfg. Co., Towson 4, Md., mentioning SCHOOL SHOP; or *circle no. J7 on the business-reply card.*

Unit Dust Collector for Small Machine Work

The Cincinnati Fan and Ventilator Company has announced a unit dust collector that is designed for operation with small machines.

The firm points out that the selfcontained unit can be placed at any small, grinding, polishing, buffing, sanding, sand-blasting, or other dust-creating machine.

The specifications state that the unit's dust-collecting system is a nonoverloading, centrifugal blower, driven by a ⅓ hp ball-bearing motor. It is mounted with a duster-filter bag on a cast-aluminum cover which fits any ordinary 20- or 24-gallon waste can.

The unit comes with a line cord, plug and switch, and 5′ of flexible, 3″-suction hose for attachment to any machine. Also, a four-wheel dolly comes with it, adding to its versatility. It can be used as a vacuum cleaner, too.

For additional information write to the Cincinnati Fan and Ventilator Co., Montgomery Road, Cincinnati 7, Ohio, mentioning SCHOOL SHOP; or *circle no. J8 on the business-reply card.*

Cadillac Plastic and Chemical Opens Sales Office in Texas

A new sales office at 500 Santa Fe Bldg., Dallas, Texas, has been announced by the Cadillac Plastic and Sales Co.

The new office will serve school buyers in Texas, Louisiana, Oklahoma, and the New Mexico area. Ernie Dourlet has been appointed sales representative in charge of the new office.

New Literature:

Craft Service is the title of the 1957 catalog published by Craft Service. The publication has been increased in size to 8½″ x 11″, providing additional space for illustrations and descriptions. The choice of crafts listed includes mosaic tiles, copper enameling, basketry, leathercraft, plastics, woodcrafts, etc. The publication is available free to organizations by writing to the firm on the group's official stationery. Cost to individuals is 25 cents. For additional information write to Craft Service, 337 University Ave., Rochester 7, N.Y., mentioning SCHOOL SHOP; or *circle no. J9 on the business-reply card and include your remittance.*

Puts Money in the Pockets of TV Servicemen is the title of a four-page, two-color brochure published by the Kingston Electronic Corporation. It gives details on the operation of the Kingston Absorption Analy-

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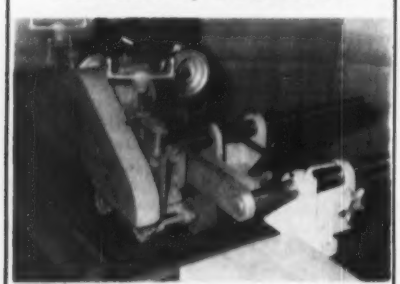

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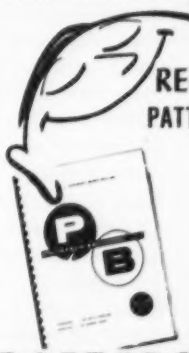

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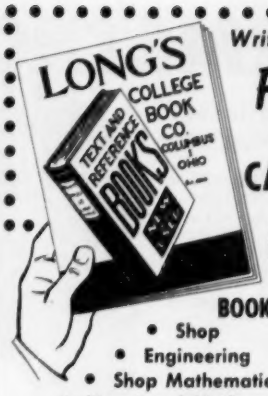
Washington . . . . *from page 48* a proposal and then tell educators, "All right, we've done our bit for education, now let us alone."

Crop Increase.—The man who keeps tab on the nation's supply of teachers has an encouraging report for 1957. Dr. Ray C. Maul, of the NEA, reports in his annual study that this June 64,500 men and women will take their college diplomas and will be available as high-school teachers. This is some 14 percent more graduates trained for high-school teaching than had been available in June 1956—and it is good news for administrators who will be searching for applicants.

It will be good news, too, for administrators needing industrial-arts instructors. Dr. Maul says that 3354 graduates will be ready to take over industrial-arts teaching stations in secondary schools. And since Dr. Maul is primarily a statistician, we follow his story primarily through figures. To measure the good news contained in that 3354 figure, it is necessary to note that it represents an increase of 26 percent over the number of industrial-arts people graduated in June, 1956. Industrial arts have enjoyed a kind of popularity among those preparing to teach. Now, the question is, will they go into teaching or be diverted to other occupations? Dr. Maul has at least a partial answer to that. He derives it by looking at last year's crop of graduates who were prepared to teach industrial arts. What has happened to them? Well, more than 60 percent took teaching jobs. The remainder found other (noneducational) work, went into military service, remained in college for graduate study, or —and here we have to accept the questionnaire replies—are still looking for a teaching job. On the basis of what happened last year, Dr. Maul assumed that 60 percent of the graduates who have majored in industrial arts will become teachers.

Incidentally, while delving into Dr. Maul's material, we rediscovered that interesting annual compilation of how the industrial-arts teaching job gets done. Take a sampling of 1,000 or so industrial-arts teachers. Are they permitted to concentrate on their major interest? The majority are—statistically, over 80 percent teach nothing but industrial arts. But the remaining 20



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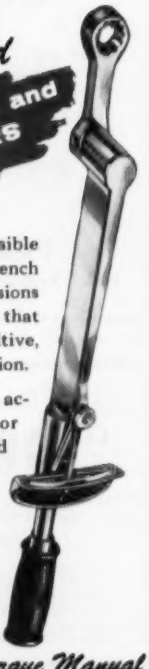
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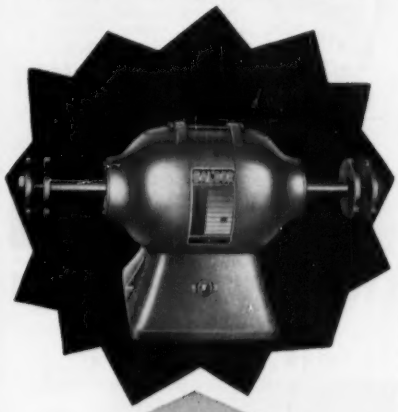

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or so percent carry multiple assignments. And multiple assignments means that our industrial-arts man will most likely also have a class or two of physical education; or of general science, or of social studies. In some instances, the industrial-arts teacher will be called upon to take over an English or even a biology class. (And by the same token, many a physical-education, or social-studies teacher will be asked to carry, as an extra assignment, the teaching of industrial arts.)

On the whole, things are improving, says Dr. Maul. College enrollments are booming, more and more of the college students are preparing for a teaching career, and the proportion of men who decide to take up teaching is on the increase. If only industry would stop luring the college-trained person, the struggle to provide every youth with a competent teacher might soon be won.

ILO.—Across the street from the offices of the American Vocational Association is the American headquarters for the International Labor Office. We visit this fascinating center from time to time in search of news. Our last visit paid off handsomely because the staff was studying at the moment—with fascination—an advance copy of the report which the director-general of the ILO was preparing for the annual meeting to be held in Geneva this June. The subject: automation.

The director-general of this world-wide organization is an American, and a former official of the U.S. Department of Labor. He is David A. Morse. The reason he decided to make automation the first item on the ILO agenda is because automation is now making its impact felt on the entire world. Australia, Belgium, Canada, France, the United Kingdom, Italy, Norway—and a dozen other countries—are stepping boldly toward this new way of using new machines, new methods, and new sources of energy to make new and more products for the world economy. Right alongside the free countries are the Communist-dominated lands, with machines and processes as good as those of the free world. The 20th Communist Party Congress has issued a directive calling for a sharp increase in the rate of automation by 1960 in heavy industry and in the food processing industries.

The ILO report is not concerned with reciting the fascinating story of what automation is doing to our economy and to the economy of the world. It is a call for action. And the action needed, says Mr. Morse, is this: Adjust our thinking.

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The focus on which our thinking needs greatest readjustment is that of the meaning of skill.

A redefinition of skill is long overdue, Mr. Morse is telling the ILO annual meeting, even now as you are reading this. He is insisting that the classical concepts of unskilled, semiskilled and skilled workers, taken over from the static, medieval guilds, no longer mean much to the industrial society of today. "The skill of the past technological era is dead," Mr. Morse is saying, "and the skill of the new era is just emerging."

And here Mr. Morse makes a flat prediction. "The prediction is that with time there will be no unskilled workers in industry; at least no unskilled workers in the sense in which we are accustomed to use the term."

For the semiskilled workers, two contrary tendencies are suggested. The first is that semiskilled workers, the men on the assembly line, the "victims" of mass production, will be "liberated" by automation and will become skilled workers or semitechnicians. The second is that semiskilled workers requiring little formal or acquired knowledge and training are going to be the key men of the automatic world, controlling and operating the robots, feeding them with the data prepared in the planning offices, adjusting the tolerances, changing tools and spare parts. In either case, however, their relative proportion in the labor force is expected to decline with the progress of mechanization and automation.

Mr. Morse's evaluation of the skilled worker runs as follows: The need for skilled workers, technicians, and engineers is likely to expand. The nature of their work will change with the progress of technology. The technicians and skilled men of tomorrow will have to be more flexible, more versatile, more knowledgeable, men who can work across industrial and occupational lines.

A Search Launched.—In short, industry and education must search for new skill definitions and skill classifications. It is good to report that one such search has been launched with the Washington conference, scheduled for May, on vocational-technical education. This small, but significant meeting, was organized by John Walsh of the Office of Education's vocational-education division. Basically, its purpose was to search for the dimensions of a new skill category—the technician. As this is being written, we do not yet have available the results of the conference. But we can say this: The conference addressed itself not only

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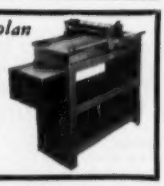

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In Review.—It'll be September before we report to you again, and this might be a good time to review our notes on the status of some of the people and measures we had been reporting on during the past months.

Be it known, then, that the director of apprenticeship, William Christensen, has taken his fight for more money to the Senate. He convinced the Senate appropriations committee to hold public hearings on his right to *promote* training—before which he vowed again that his bureau will do no actual training itself . . . Be it also known that Senator Lister Hill is biding his time in directing the legislative course of the area-vocational bill—no public hearings having been scheduled up to this moment . . . Our notes from Congress also say all is well with the 1958 appropriations for vocational education—the full sums authorized and requested will be granted. . . .

"Things are routine at the U. S. Office of Education," our informant tells us, a state of affairs which will change by July and August, when the 1958 funds for research and administration become available . . . The American Vocational Association is busy with plans for its upcoming convention, which, being an experiment, deserves a few words of comments.

The experiment is that the meeting will be held in the summer, instead of winter as has been AVA's custom. We are told that the switch to the summer meeting was a mandate from more than half of the vocational teachers who are AVA members. The Vo-Ag teachers, especially, have wanted a summer rather than winter convention. On the other hand, many T&I people aren't so pleased with the proposed change.

The experimental convention will take place in Philadelphia, August 5 through 9. All meeting rooms and hotel rooms will be air-conditioned. ★

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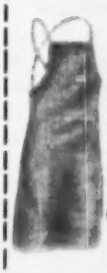

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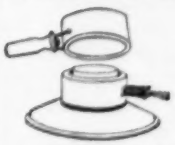

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from Washington

by Michael Paca

Thin Soup.—Back about two months ago, on April 4, two unconnected events took place which all but ended the battle for federal aid to education for 1957. On the surface, the two events of that day appeared encouraging. First, President Eisenhower addressed a nationwide series of NEA birthday dinners and delivered what was advertised as a major statement on education. And on the same day, the House education subcommittee approved and sent on to the full committee H.R. 1, amended. This was the Kelley bill as sponsored by the Democrats, but with enough of the provisions demanded by the Republicans to make it a "compromise" bill.

What the advocates for federal aid hoped for from the President at the NEA birthday dinner was a fighting speech, a strong appeal to Congress to start lining up votes for the bill. Instead, the President served up what is described by one NEA official as pretty thin soup. Here, in April, was the President's big chance to make a case for federal aid. Instead, he praised Lincoln's views on public education and allowed that federal aid should be a stimulus to correct an emergency situation and that it should not be permanent. NEA, privately, called this avowal of principles "wholly negative."

The action of the subcommittee in voting out a compromise bill was equally dispiriting, because with it came no ringing affirmation for federal aid. Rather, it was a perfunctory action; and even as the measure was being sent on to the full committee, Congressman after Congressman declared either publicly or privately they would have nothing to do with it.

Throughout April and May little happened to advance the bill's chances. Lobbyists for the bill counted the imaginary, potential votes that would be needed to get House approval for the bill. Secretary of Health, Education, and Welfare Folsom continued to talk bravely about the measure's chances for success. But Congress returned from its Easter vacation without new enthusiasm for the proposal. And although a spurt of activity is promised for June, the bill faces either outright defeat in the House or slow death by inaction. The Senate education committee has not even bothered to examine what the House has proposed.

It is fashionable in Washington today to pin blame for the downfall of federal aid on the U.S. Chamber of Commerce. The Chamber has been conducting a strenuous and even masterful campaign against the measure. But it can do so only because Chamber officials are encouraged by the business world. "And the business world," says John Miles, a Chamber executive, "is not convinced that states and communities need or will use federal aid even if it is enacted at this time."

This lack of believability in the efficacy of the Kelley bill apparently is also characteristic of the education world—outside of the lobbying groups. There is a strange silence on the part of school administrators and teachers. The mail reaching Congress from home rarely includes a letter from a board of education member or other school person endorsing federal aid. On the other hand, there is plenty of mail endorsing bills which seek to allow tax deduction for professional expenses of teachers and school administrators. Educators want the plan enacted and are saying so to their legislators.

By an ironic twist of events, tax deduction for teachers may become *the* federal-aid measure for 1957. Bills for this purpose seem to be moving toward enactment with little difficulty. The bill which seems most likely to be approved is H.R. 4662, by Rep. King, a Democrat from California. Under this measure, a teacher who incurs expenses for tuition, books, travel, and living expenses while attending summer school or evening classes could deduct the outlay up to $600. Now, there is a concrete figure, there is a popular cause, and there is a measure of relief for education. Many a Congressman would like to support such

(*Continued on page* 44)

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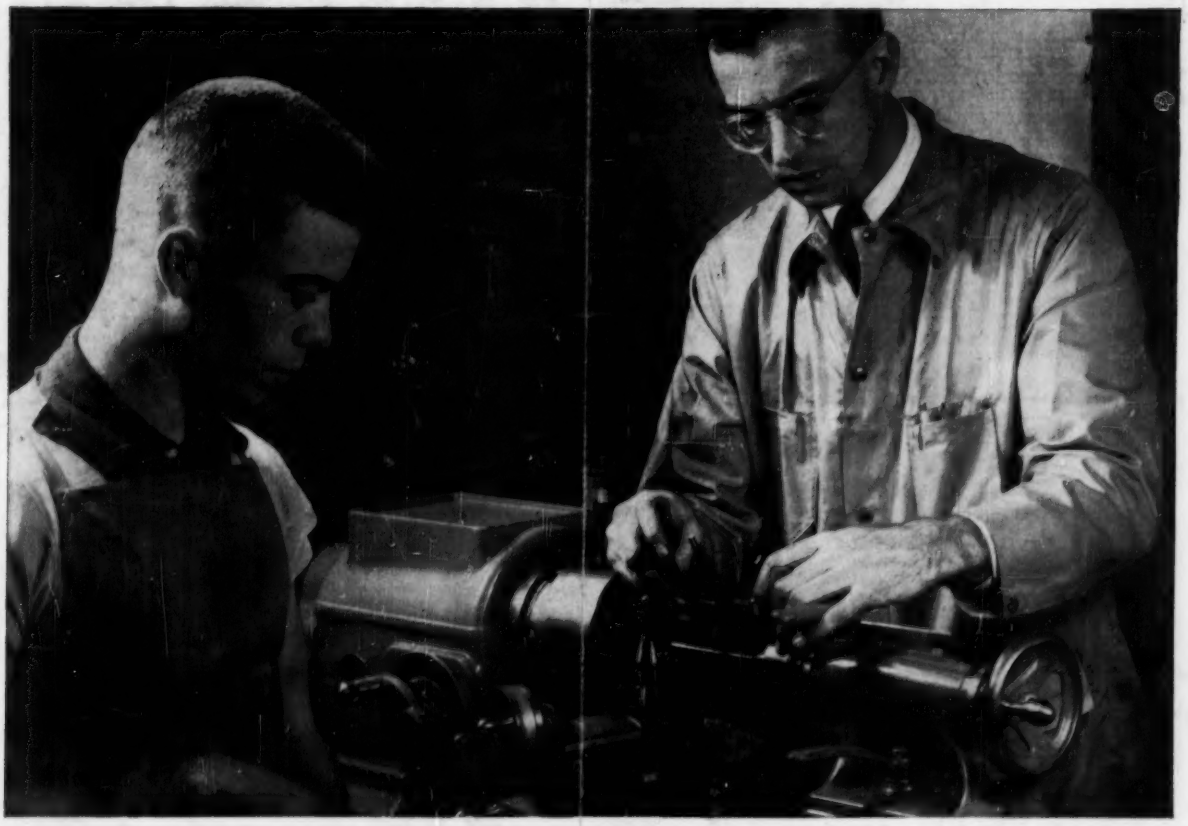

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